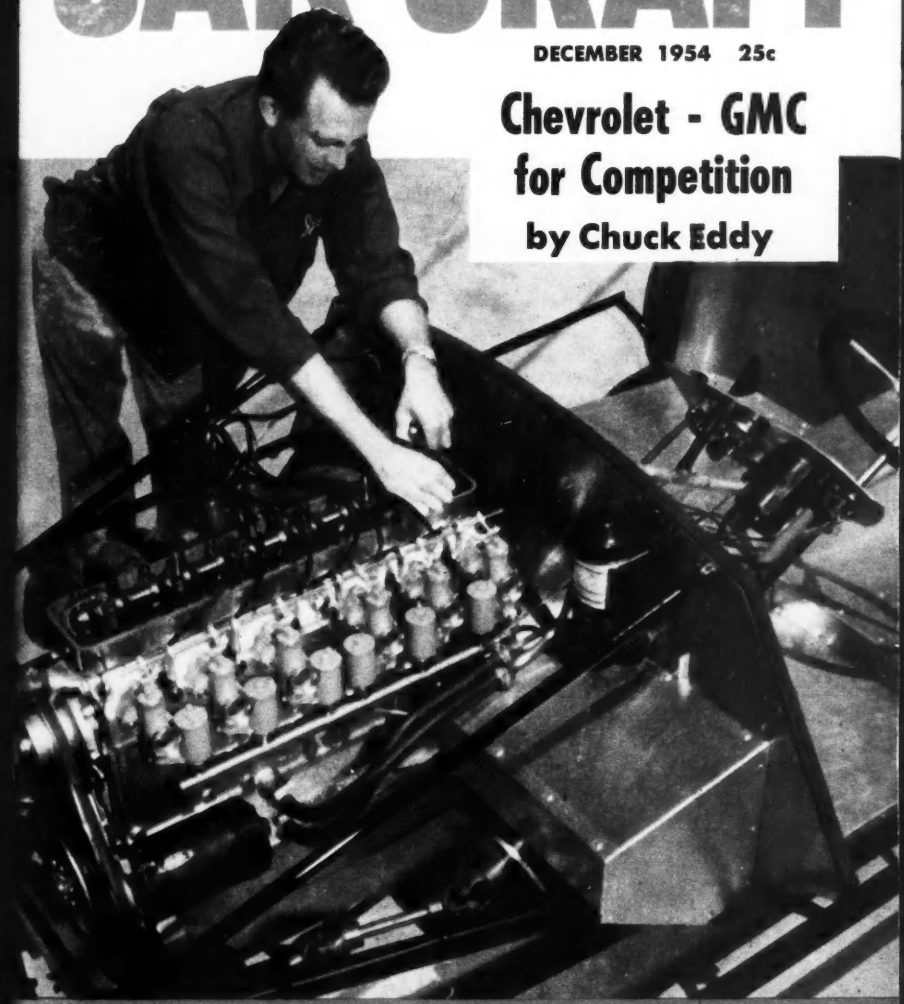
CAR CRAFT

DECEMBER 1954 25c

Chevrolet - GMC for Competition

by Chuck Eddy



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CAR CRAFT

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COVER

Final adjustments are made on Dick Lane's full-bore GMC which will be used for both drag and road racing. To see what makes a "Jimmie" get up and make like a race car, check pages 14 through 19, this issue. *Ektachrome by Tom Medley*

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BRIEF AND TO THE POINT:

234 Words From The Editor

WE'VE always been of the opinion that chemical horsepower, in the form of nitrates, peroxide and other oxygen bearing compounds, has been relied on much too heavily in the past few years. Instead of going all out for super-fine tuning *after the engine has been built,* too many engine builders have been relying on big doses of "pop" with little or no conception of just what the stuff is doing for, or to, the engine in question. Scattered bits of engines at race tracks, drag strips and at Bonneville attest to the misuse of these super fuels.

In the latter instance we were borne out this year when the Guy Mabee car, restricted to gasoline, and pump gas at that, turned up a 195 mph one-way time. Mickey Wysong, the driver, told us later that there was more left in the big bear even at that speed. What's more, the car used less than a gallon of fuel to go the distance, somewhat of a contrast to the five or more gallons of "pop" used by some of the other entries to go the same distance at *less speed.* It ought to prove something but we won't labor the point. One thing *is* very obvious, though. If you use nitrated fuels, study their characteristics first, paying particular attention to flow characteristics and anti-detonant qualities. There'll be less pain and more gain.

THINGS TO COME

THOSE of you who are "Jimrolet" fans may notice a few blank spots in our GMC-Chev story this month. Don't despair, Chuck Eddy hasn't slipped up. It's just that those blank spots are points that require more space than we have at this point to give them. They'll be covered and any questions engendered by last month's article will undoubtedly be answered.

Also coming up is the continuing story of how you can build a hot modified stock car. Next month we'll cover such goodies as balance, setting up the cockpit and body modifications. We've had so many requests on this kind of thing that we're going to go full-bore on it. Stick with it and you'll have a car ready to go when the season opens in the spring. If you have any questions as we go along, fire 'em in. We're here to help you.

With this issue we've also started a series on interior trim. This month, it's side panels. Next month and the month thereafter we'll cover seat upholstering and headliners. If you're the kind of guy who likes to do his own work, don't miss 'em. We've also picked up many goodies at Bonneville, so if you've been wondering how the boys go fast at 4000 feet above sea level, just check in with us once a month.

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LETTERS

FOUR-BARREL

Dear Sirs:

After countless readings-over of your fine coverage of the Ford Industrial Four, many projects come to mind: An "A" class dragster, or streamliner or lakester; a conversion for a restored Model T or A; and a conversion for an MG TD roadster. What with present financial limitations, it looks as if the MG conversion will have to do for now.

Sure hope that the Ford Four-MG transmission mating information finds its way into print.

More than anything, though, I hope that you continue your policy of putting things across objectively and instructively; especially as regards your explanations of various operations. Despite the "Mash Note" and "Dear John" contributions to "Letters" in September's issue, I think you'll find that a sizeable majority of readers appreciate your thoroughness, regardless of the subject. As for me, I'm in favor of the entire program: Drags, lakes meets, trials, road races, customs, roadsters, and especially technical features; for the benefits that all contribute toward making automobiles the worthwhile and satisfying possessions that they are.

Yours sincerely,
Al Grissom
Newport, North Carolina

NO GRIPE

Dear Sirs:

Just to be different, we have no gripe with your magazine.

We are in the Navy and right now, overseas. So far we haven't been able to obtain your magazine every month.

We think your magazine is great and can't figure out why so many guys are griping about it. We have worked on rods and customs and feel that technical articles will help you much more than pretty pictures. This magazine covers all cars, foreign and otherwise, and we feel if the MG article helped the MG owners, no matter how many pages were used they weren't wasted.

Upon returning to the States we plan to take our 296 cubic inch Merc out of the roadster and place it in a '33 Ford competition coupe.

Would like to see an article on rear engine mounting and swing axles.

Sincerely,
R. W. Duncan, J. R. Love
Alameda & Berkeley, Calif.
Now in Japan

We'll do our best to dig up a story on rear engine mounting.—Ed.

MORE FOUR

Dear Sirs:

Your magazine is incomparable even though it is small.

I became interested in the "Ford Four" conversion articles you recently published, but now I have a few problems.

1. Were the performance figures you published for the four cylinder engine for the stock engines or modified engines?

2. I am planning to build a tubular chassis sports car incorporating the Ford four and Morris Oxford front suspension. Now,

how would this supension hold under the engine weight and speed?

3. Also planning to use an MG transmission coupled to the Morris Oxford rear end, what do you think?

4. How would the combination work?, and what would the over all ratio be? If this combination was not satisfactory what other would improve operation?

Yours truly,
D. Shanon
Ottawa, Ontario, Canada

In answer to your questions in order: The performance data was for the stock engine. In the JD Mk II series, performance would be around 100 to 110 bhp at approximately 4800 to 5000 rpm, depending on cam timing. The Morris front suspension is one of the very best you could use and the rack and pinion steering that comes with it is one of the finest. The MG transmission will work if you use the TC series box. DO NOT under any circumstances put more than 70 bhp through the TD series transmission. You have an almost unlimited choice of final drive ratios. The Morris is a good one or you can use any of the Ford ratios from 4.33 up to 3.78 with 4.11 being about the best.—Ed.

HARD-RIDIN' '50 FORD

Dear Sirs:

I have a '50 Ford V8. Although I have 68,000 miles on it, I plan on keeping it at least another 2 years.

The only thing wrong with it is that it rides hard. What can I do to make it ride easy? Would increasing the tire size help? If so, what size should I buy?

Is there such a thing as an oversize shock-absorber? Certainly would appreciate any suggestions or advice that you could give me in this matter.

Kindest regards,
Norman A. Robbins
Baytown, Texas

Yours is the first complaint we've received on the "hard" ride of the '49 through '53 Fords. Most owners complain that it's too mushy, an opinion with which we're inclined to agree. If you soften the ride any more the car could easily become a death trap due to sloppy handling characteristics that go with oversoft springs and tires. There are oversize shocks, known as "Silver E's", but these will only stiffen the ride, not soften it. An article in the near future will detail the installation of these large shock absorbers.—Ed.

FULL HOUSE CUSHMAN

Dear Sirs:

I'm a hot rod and custom car addict if there ever was one.

I have a full collection of car magazines from way back, including a subscription to CAR CRAFT. Although I'm not too well situated to buy a car as yet; I do have a scooter which I'm pretty proud of and I think it's pretty rare. I have two Cushman carbs on a home-made manifold, head milled, and dual pipes, of course. I've had it up to 75.7 mph. Not bad for a '45 Cushman, do you think?

Keep printing the best car magazine.

Michael Provinge
Lake Lotawana
Lee's Summit, Mo.

You've made a good start, Mike; keep it up.—Ed.

YET MORE FOUR

Dear Sirs:

Just a quick note to extend my hearty congratulations for a good job well done in the issue of October 1954. It is the best you have ever published and you should feel very proud of your accomplishment in the field of automobile magazine publication.

Was particularly interested in your article, "Lil Stinker" and would appreciate further information on this little car. Can the photographer, Eric Rickman, furnish some 8 x 10 shots of this car for me? Sure would appreciate it if he could.

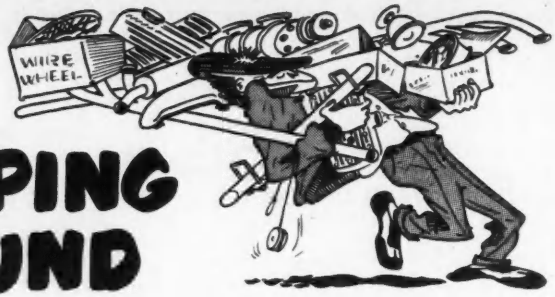
Thanks again for a swell little magazine and for your continued interest in automobiles.

Yours very truly,
John H. Olson, Jr.
San Antonio, Texas

P.S. How about an article on Ford-Ferguson engines for "special" competition etc. A reasonably fast engine for its size, very tough and dependable and parts can be had.

We'll turn your request over to Rick. Thanks for the plug, John. For a good four-barrel engine, check the June '54 CCM.—Ed.

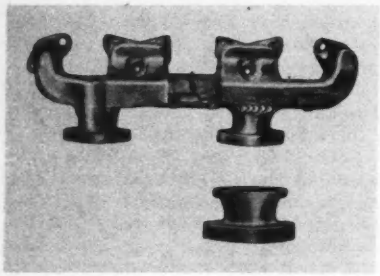
(*Continued on page 63*)



SHOPPING AROUND

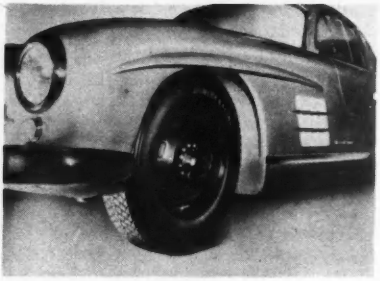
CAST OUTLET

A NEW, versatile dual exhaust casting designed for splitting stock manifolds on 6- or 8-cylinder in-line engines is now available. This new casting will take care of any exhaust pipe up to and including two inches. The opening through the casting is maximum size and designed for free flow of exhaust gases which reduces back pressure to a minimum, according to the manufacturer. The price of this new dual exhaust casting is $3.75 from Arrow Auto Parts, 1606 Washington Avenue, No., Minneapolis 11, Minn.



FULL RACE DUNLOPS

DUNLOP Tire and Rubber Corporation, Buffalo, N.Y., has announced the availability of Dunlop R1 Normal full racing tires and tubes from the Buffalo plant. Because of the specialized nature of the manufacture and sale of full racing tires, Dunlop does not distribute these through their regular dealer organization. Sales are made to owners and drivers of racing cars directly from the plant in Buffalo, where a fairly complete range of sizes is available from stock. Deliveries of the tires are made freight prepaid from Buffalo. A condition of the sale of Dunlop full racing tires is the signing of a release from liability by the purchaser of the tires. The following listing shows the sizes of tires and tubes in the range now available from Buffalo.

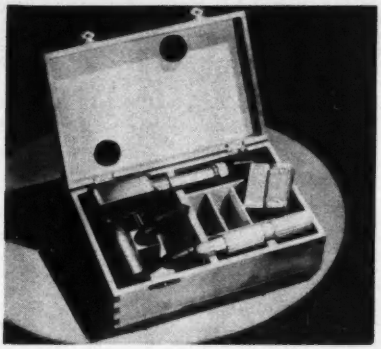


TIRES

4.00/4.25-15	5.00-16
5.00-15	5.25-16
5.50-15	5.50-16
6.00-15	
6.00-16 Reinforced Beads	
6.50-16 Reinforced Beads	
7.00-16 6 ply	
4.50-19	

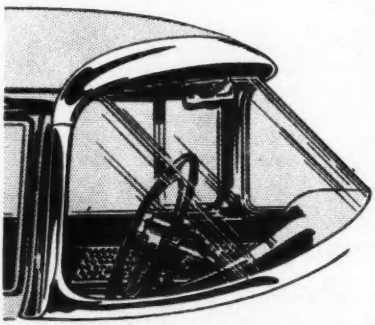
TUBES

4.00/4.25-15	6.00/6.25-15
5.00/5.25-15	5.00/5.25-16
5.50/5.75-15	5.50/5.75-16
6.00-16	
6.50-16	
7.00-16	
4.50-19	



RECORDING COMPRESSION TESTER

FISHER Products has just announced the availability of the MoTest Recording Compression Tester kit in a hardwood, fitted instrument case. This unit has been designated the Model 285-W, and in addition to tailored pockets for the various components, there are four compartments for storage of Recording Charts. The price is $29.00. The Model 285 (Standard Packing) is $27.50. Units are available for immediate shipment. Order from: Fisher Products, 21-21 44th Drive, Long Island City 1, New York.



SUNSHADE

A NEW shade, just introduced, is the first outside metal windshield sunshade designed to blend with the exterior trim of a car as in original factory equipment. An extra-wide shading area throws a sun-protecting shadow over the most important 24% of the windshield. The shade is made of durable stainless steel and designed for long wear and permanent rigidity. It has a highly polished stainless steel exterior and green finish on the driver's side. Made in several models to fit all popular makes of cars, it can be easily installed in 15 minutes and is individually packaged, complete with all fittings and installation instructions. Available at auto supply stores. For name and address of nearest dealer, write Foxcraft Products, Philadelphia 40, Pa.

SAFETY BELTS

THE SEAT belts made by Automotive Safety Associates are any motorist's best insurance against sudden death on the highway. Occupants wearing safety belts are protected against the most frequent causes of crash injury and stand an excellent chance of surviving even a total-loss smashup. The soft high-gloss nylon webbing of the ASA belt withstands impact loads well in excess of the 3,000 lb. minimum specified for aircraft belts by the Civil Aeronautics Authority. The buckle is designed for great gripping strength but can be released and adjusted in split-seconds by one hand. For $12.95 a safety belt kit which includes the fittings for installation and a simple, illustrated instruction brochure will be sent postpaid. Order from: Automotive Safety Associates, 12145 National Blvd., Los Angeles 64, Calif.

"GET OFF MY BACK!"

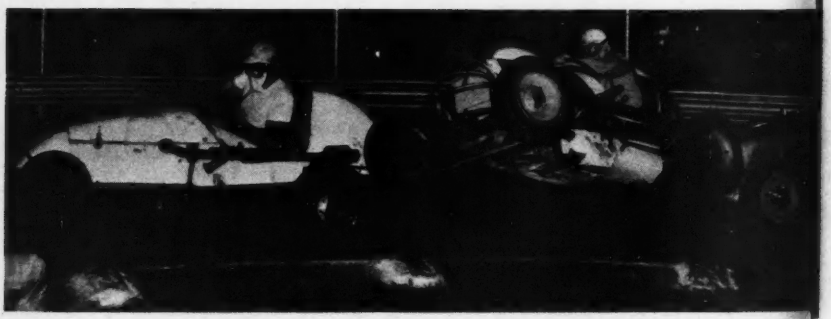
By Dick Day

"Say man, get off my suedes!" Clyde Palmer (96) gets a full lap of wheel in this corner mixup. Crowd attendance usually hits the four-thousand mark. Many are left standing at the ticket booth because of sell-out.

IF YOU happen to be in Oakland, California after the first of the year and miss out on Bay Cities Racing Association's favorite winter racing activity, you have only yourself to blame.

There are races of all kinds to be seen during the year, but this particular breed of circuit riding is unique. It started in 1949 after the success of similar indoor events in Chicago's International Amphitheatre and several New York armories. The track, in the Oakland Exposition Building, is a 1/10 mile asphalt oval on which the screaming midgets average between 50 and 55 mph.

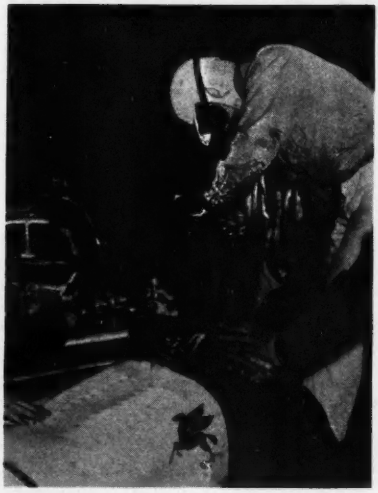
Ford sixties dominate. Offies have been tried with only a little success due to their high revving characteristics, the Ford building up its torque at the bottom end.



All the drivers seem to have developed their own individual cornering techniques. Some are a little more radical than others, but nevertheless a bit on the stylish side.

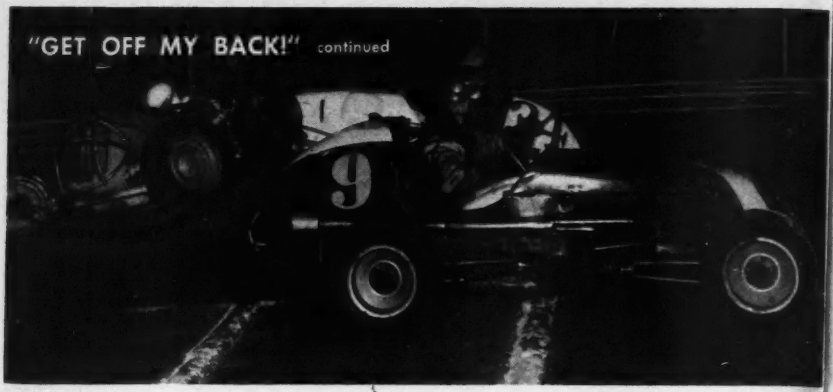
Here's What Happens When It Rains in California . . . AND THEY CALL IT RACING!

Photos by Russ Reed



Clyde Palmer again has to remind his competitors that he and a wheel just won't fit in the small cockpit. Angelenos don't know the meaning of "SMOG" 'til they've sat through a fifteen-car, thirty-lap main event.

Separating the spectators from the cars and the course is this heavy wire fence and metal band that has much bounce to the ounce. Some try to be like four-wheel motordrome experts but usually have to be pried loose.

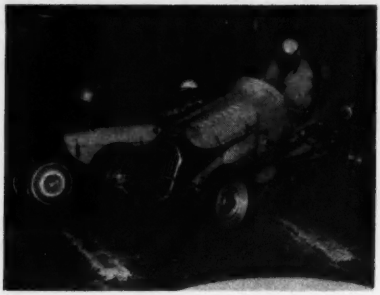


Tommy Morrow (9) a driving spectator at this point, watches two of his companions decide who's going to be first over the finish line. The main event, with fifteen cars racing, has to be stopped and restarted as many as eight to nine times due to traffic snarls and accidents blocking the track. Don't forget the track is only one-tenth of a mile in size.

"Well I'll be doggone, wonder how that happened?" Accidents sometimes end up on freakish side such as this one with wheel wedged underneath the metal guard rail.

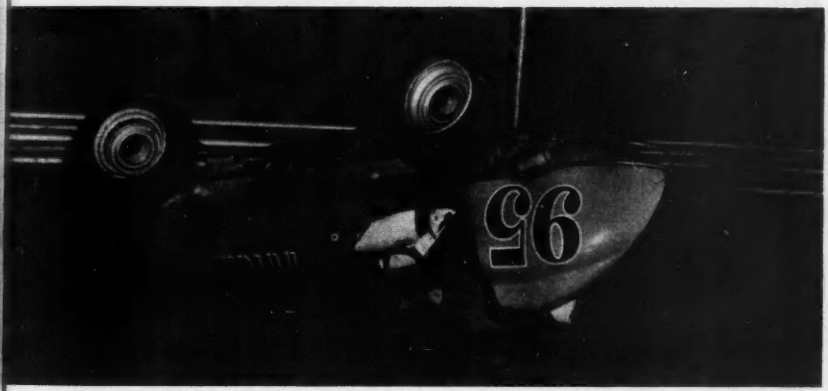
When four cars try to make a corner, as in this case, it usually means a restart. Cars circle infield 'til positioned again, then move on to the track for running restart.

"Hey Ref, I've heard about banging draft, but what do the rules say about this?" Maybe the guy's just tuckered out. Accidents are many with very unpredictable outcomes.



Like the man said, "If you can't go around them, GO OVER 'EM!" Wiser words were never spoken when describing action on this small course. Program features eight events.

We were unable to identify the man that's down on the track, but there's a saying that the fastest thing on the track is the photographer . . . and you know, we believe it!



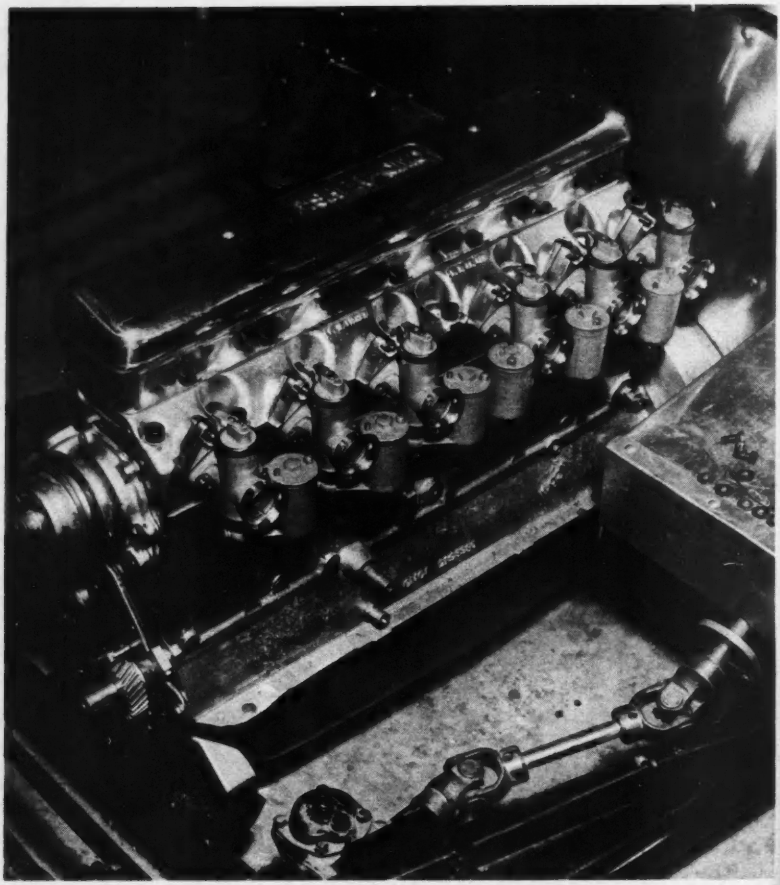
Sometimes it happens, and a few get bent out of shape and on their heads. The indoor fatality rate is a big fat zero, with the most serious injuries being of a minor nature.

The pit crews get quite an extensive workout throughout the evening uprighting and untangling the small doodlebugs. The races are held Friday and Saturday nights.

We don't know what this guy Clyde Palmer did, but again he's being helped from his car. You know, a guy can take only so much then, "POWIE—right in ze orchestra pit!"

If You Want Inches in Six Cylinders and You Don't Mind Controversy, Try

The CHEVROLET and



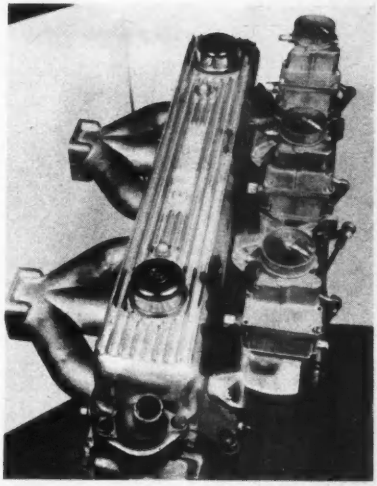
Full-bore Fisher-Horning 12-port head, used on Dick Lane's 302 GMC, note six Amal carbs.

By Chuck Eddy

Photos by Bob D'Olivo

GMC for COMPETITION

WITH great restraint, in last month's CAR CRAFT we tried to give our conception of a Conservative Chevrolet modification. This time we'll relax the ground rules for our engine and anticipate the expenditure of more money to buy more horsepower and, incidentally, more cubic inches. In gathering material for this article, we were quite impressed, not by the many brands of equipment available for Chev and GMC engines, but rather by the unending combinations of engine size and type which are obtainable. Using two blocks and two cranks in combinations of various bores and strokes, it is possible to build engines from 228 cubic inches to 330 cubic inches displacement within nearly the same physical size and weight! Until the advent of the new 302 GMC engine, displacements of over 300 cubic inches were of rather doubtful durability, obtained by considerable boring and stroking. These size options make it easy to conform to various competition displacement classes without serious engine weight penalties.



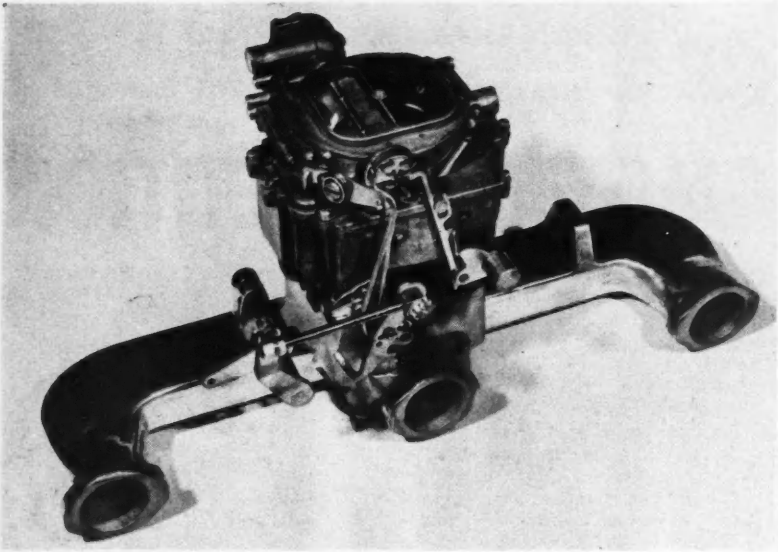
Wayne Chevrolet conversion is also 12-port unit. This set-up is used for street, track.

As in the first installment, we'll start at the lower end and work up in the engine.

Bottom End

Both Chev and GMC engines are blessed with liberal bearing areas and four main bearings with reasonable spacing. Whether the lower end will stand up under competition usage will not depend on the design but rather clearances, liberal oil supply, and proper fit up of main and rod bearings. For these reasons, we suggest that any use of the Chev crank in a "Competition" engine will utilize the grooved journal and full-pressure drilling to crank pins. We know that many exceptions to this are still running, but the fact remains that the more effort we put into an engine, the more worth are such items of insurance as full pressure oiling. As leakage rates at all bearing surfaces increase with rpm and oil warm-up, the grooving of the main journals is necessary to maintain adequate supplies at the rods and pins under these conditions. Use of 1953 and later Hi torque parts is an easy way to accomplish full pressure for the Chev, but the most satisfactory all-round conversion is probably the Wayne full pressure crank kit for $185. This includes crank (drilled), rods, bearings, pistons, pins and rings. Available in standard or High torque strokes and up to 3¾ inch bore, this kit is

(*Continued on next page*)



Progressive carburetion is the coming thing and Chev is no exception. Here's Wayne unit.

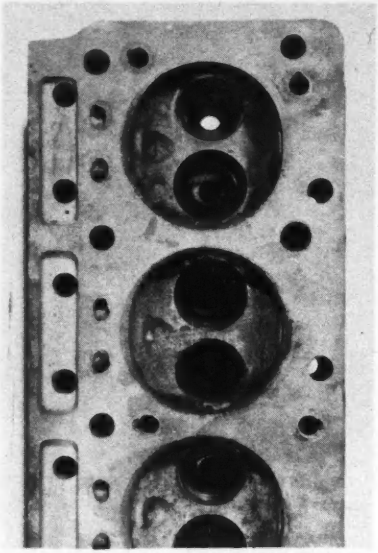
(*Continued from preceding page*)

about the ultimate for Chev engines up to 244 cubic inches.

When engines over the 250 cubic inch size are contemplated, the GMC engines become the best bets. If cost is a relatively minor consideration, the newer "302" block may be used with "270" crank (lighter than the "302") and 4 inch kick-up pistons. Capped with a "270" head, this will give you an engine of 302 cubic inches with the beefy 302 block which has desirable internal stiffening plus about 3/16 inch thicker walls at the 4 inch bore than the bored out 270 would have. Purchase of a 302 short block might be indicated, except that the flat-topped pistons and heavy crank would leave something to be desired for compression ratio and high rpm operation.

R.P.M.

At this point the "Jimmie" camp is definitely divided on the peak speeds at which the engine should be operated. One school of thought gears their monsters to peak at 5000-5200 rpm, the point at which the bhp peak probably occurs. The "screamers" maintain that they go best at 7000 rpm. This is but one of the controversial points that our adventure in Jimmie land turned up. We are inclined to look at the original design intent of the engines and recommend gearing that will allow operation most of the time under 5500 rpm. Valve train loading at the higher ranges requires fantastic spring pressures to follow the busy cam lobes, while at 5500 and below the loadings are more tolerable. Also, a factor not to be overlooked is the basic balance characteristics of both engines. If pistons much lighter than the stock buckets are installed, the harmonic balance characteristics may be mysteriously altered. We say mysteriously, because many balancing outfits do not take the trouble to remove the necessary metal from the counterweights when considerable alterations in the reciprocating department are made. (It's more trouble!) Howard Johansen states that undue concern over balance of the GMC assemblies is wasted effort. Accordingly, his pistons reproduce the stock weights and he finds the shaft balance in the stock state completely satisfactory. (Remember,



Combustion chambers in 270 GMC head are of pop-up design as seen in the stock head.

we're talking about sixes, which do not have serious rocking stresses in their balance problems.) Another contributing factor to high rpm failures is the reluctance of oil to flow out to all the rod bearings *against centrifugal* force, even with considerable pump pressure. This bug is difficult for the modifier to whip by redrilling *any* shaft, but it may point out some obstacles to over revving.

Rods

The comparison photo of the Chev and GMC rods brings forth another good reason for selection of the GMC parts, wherever possible. Pardon us if we consider the split pin end archaic design, but we do, in spite of all the engines that don't seem to mind using them. We're in favor of eliminating stress concentrations in this department, and the GMC design does it better. Pressure to the big, fat .990 inch pins, through the rifle drilled rods, is also a sanitary feature. In some fine racing mills we have seen, a stream of oil from the top of the rod has been utilized to cool the piston on its under

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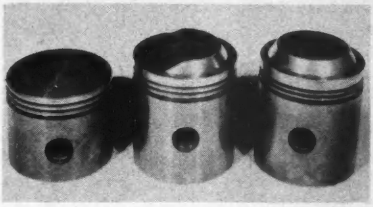
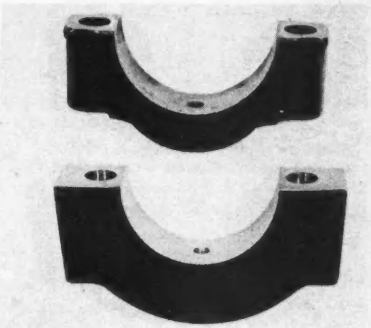
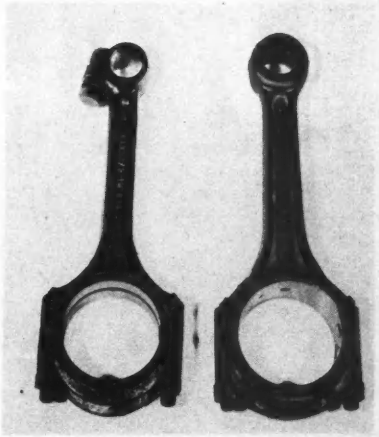


GMC pistons from left are 302; 270, low compression; 270 high dome for Wayne use.



Stock main caps as shown at top may be replaced by steel Wayne units shown below.



Chevrolet rod at left uses split pin-end, a weak point lacking in big GMC rod (R).

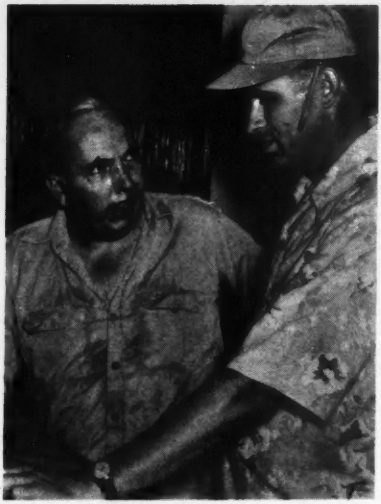
(*Continued from preceding page*)

side. It would be convenient if this turned out as nice as it sounds for endurance on NITRO!

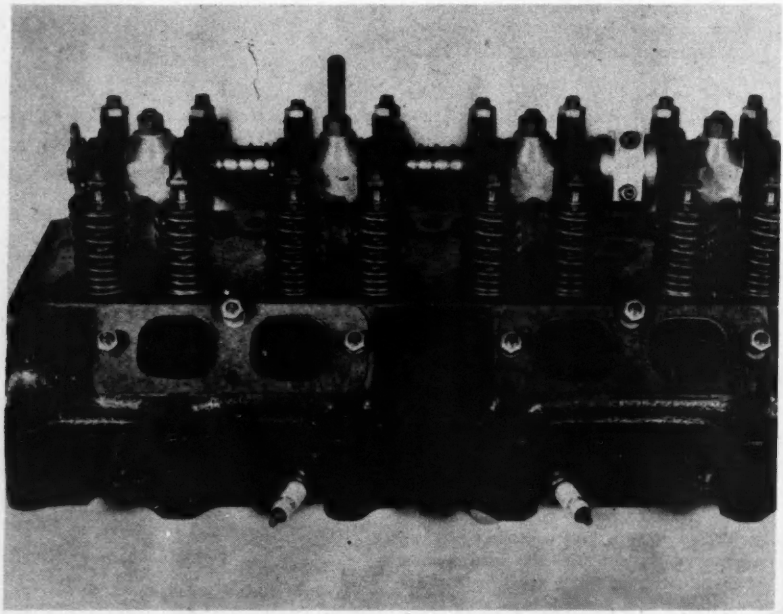
Magnafluxing of the rods is O.K., if you're the worrisome type, but primary failures at this point are relatively rare. Rod alignment should definitely be given considerable attention as the large bores and relatively long skirts of most of the GMC pistons can create considerable friction when mis-aligned.

Before we get out of the lower end completely, we should mention that heavy steel main caps are available from Wayne for journals number 2 and 3. These intermediate main bearings naturally bear the brunt of high outputs and the heavy caps are excellent insurance. On installation, they must be bolted to the block and line bored to receive main inserts. Clearances not to *exceed* .003 inch should be used on both rod and main bearings, with as close as .002 inch desirable if the engine will not ever be

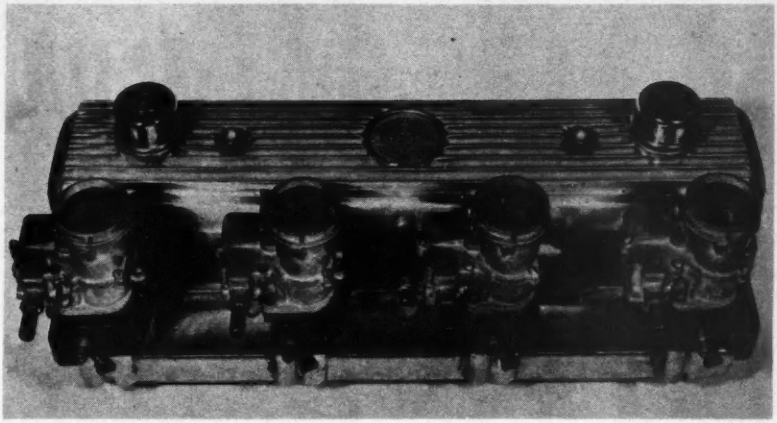
(*Continued on page 62*)



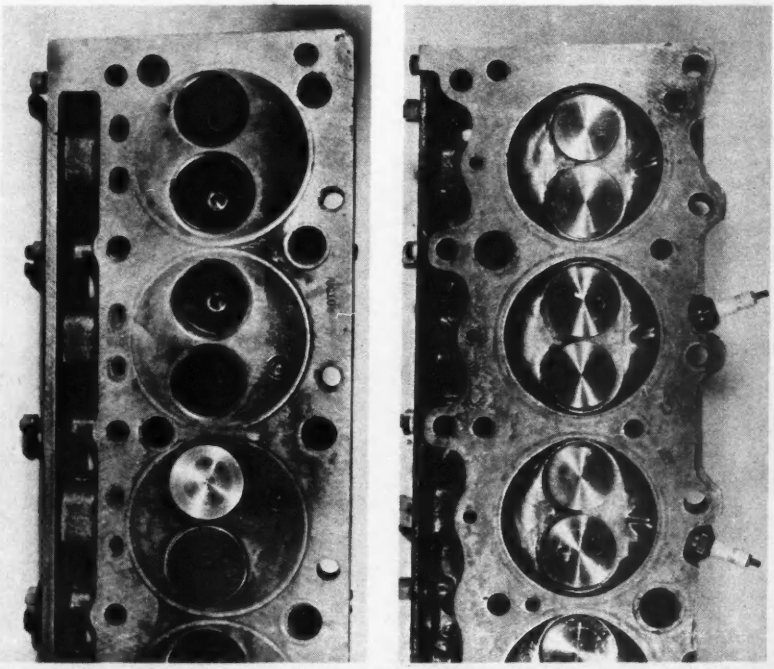
Harry Warner, left, gives some of latest dope on the GMC to a well-known Ford fan.



Port face on Wayne GMC and Chev head is slanted to give a direct flow to intake valves.



Almost any type of manifold can be used on the 12-port head. Here a plank-type manifold is used with four Stromberg 97 carburetors. For another combination, see cover photo.

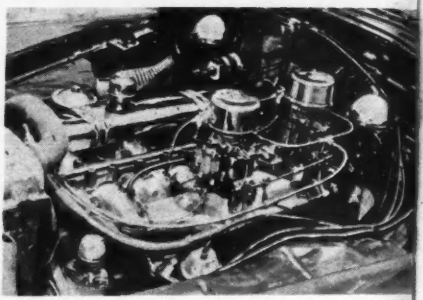


Flat-topped head, left, is used with standard type 302 GMC block. Head on right is Wayne unit for use with 270 block or 302 block when equipped with special pop-up-type pistons.

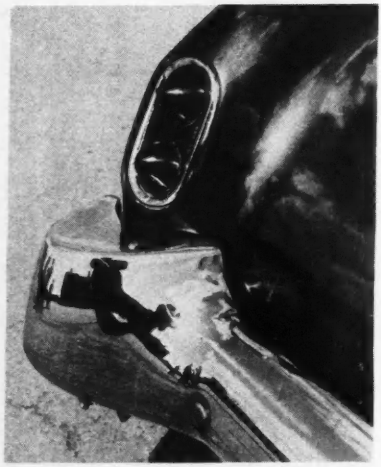
Missouri Custom

Text and Photos by Robert Hegge

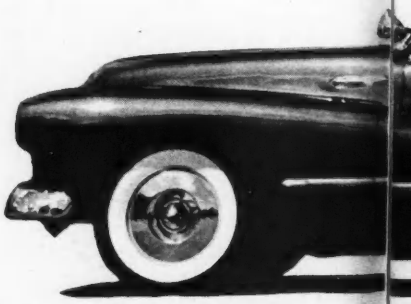
Headlights were tunneled and frenched by utilizing stock '53 Merc headlight rims.



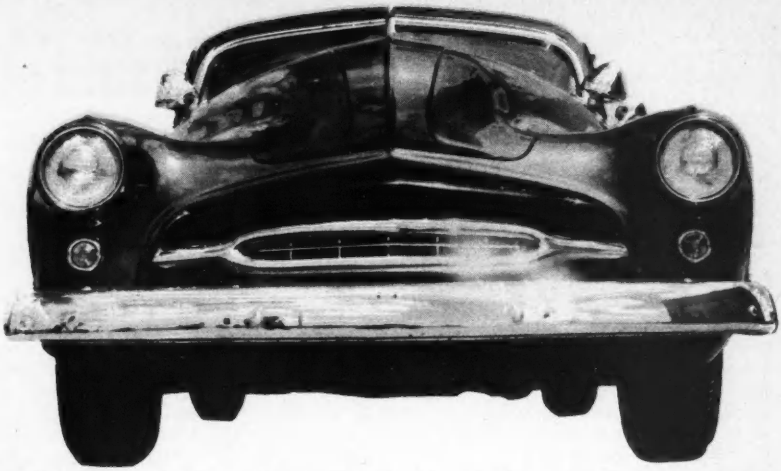
Under the hood lies this beautiful 332 cubic inch rejuvenated Buick powerplant. Installed are sterling pistons, Edmunds dual manifold, ¾ cam and a Mallory ignition.



'50 Buick taillights replace the stock units. Rolled edge around taillights was accomplished by using tubing. The bumper is from a '49 Buick and has outer tips filled in.



Buick was lowered moderately by chopping

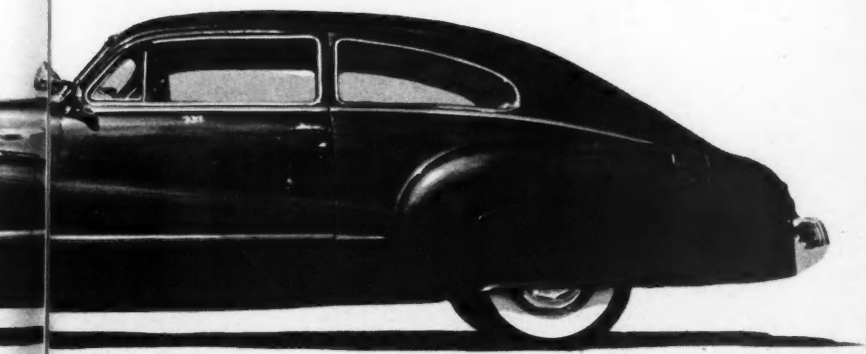


Grille shell was built from sheet metal and tubing. Grille's center bar is from '54 Pontiac. Hood has been shaved and peaked, also tops of fenders have a slight matching peak.

A HITCH in Uncle Sam's Navy can, quite often, give an automobile enthusiast quite a bit of time to ponder. During the "waiting" portions of the "hurry up and wait" routine, a guy can figure out more ideas than he knows what to do with. Such was the case of Barry Lovvorn, of St. Louis, Missouri.

When Barry got out of his dress blues, he found that he had a '46 Buick and a number of ideas on his hands. The thing that made it intriguing was that the Buick is not necessarily considered torch-bait. This meant that few, if any, other customs would be anywhere near like Barry's efforts. After six months with torch and rod, the Buick came through considerably changed for the better, drawing more than its share of comment as it purred around town.

The engine, too, came in for its share. If a section isn't chromed, it's painted, and if it's neither, it's polished. In short, the whole car, from truck to keelson, gleams like the jewel that Barry dreamed about during those long watches.



coil springs. Exterior color scheme is tan and lime. Interior is rolled and pleated.

DOUBLE-BARRELED

Text and Photos by Ed Monroe

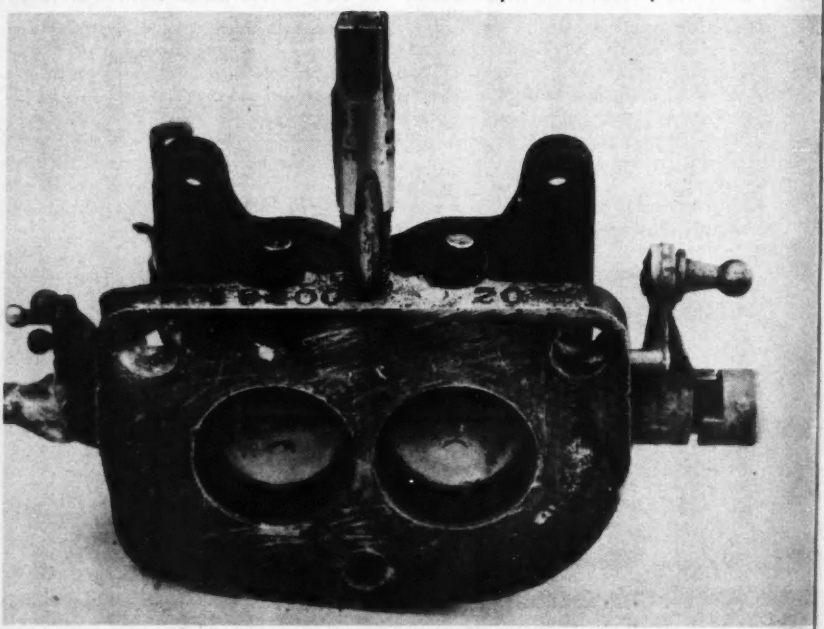
STROMBERG models 97 and 81 carburetors are frequently used for any and all conversions. They are readily available and can be obtained for a small price at any junk yard. By using special adapters or risers these double barreled carburetors can be made to work on many makes and models of engines.

Being double barreled gives them greater varsatility than single barreled units and the Stromberg can be made to perform as a set of dual carburetors by designing a manifold to carry the mixture from one barrel to one set of ports, and that of the other barrel to the other set of ports.

When these carburetors are used on engines other than the prewar Ford V8, certain changes are often necessary.

One of the problems which beset the mechanic who wishes to use one or more of these carburetors on an engine other than a Ford is how to hook up the distributor vacuum in order to obtain satisfactory performance. Since there is no provision for attaching the distributor vacuum line to these carburetors, many mechanics tap into the manifold. This is unsatisfactory for most engines using a stock distributor, as this gives too much suction at slow idling speed and, consequently, too much spark advance at this speed, resulting in annoying roughness. If the distributor is retarded to give the proper timing at idle speed, it will not be advanced sufficiently at normal operating speeds to obtain best efficiency.

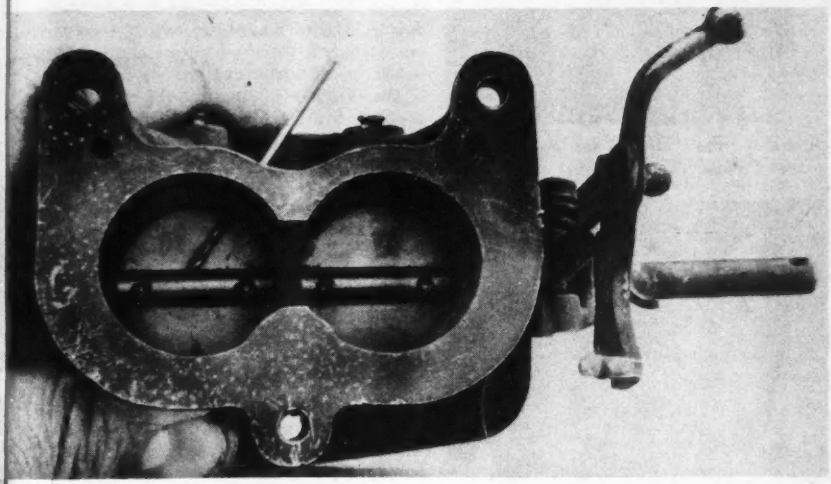
A look at the carburetors originally designed for these engines will show that the suction hole in the carburetor throat is so located in respect to the butterfly that the mani-



After drilling base with an R drill, the hole should be tapped for 1/8-inch pipe fitting.

DYNAMITE

You can adapt Strombergs to ANY car



Drill through side of either barrel, above butterfly with a #52 drill. See text below.

fold vacuum cannot reach the hole until the throttle is opened slightly, and therefore the engine has full retard at slow idle.

The following paragraphs explain one method of modifying the carburetor base to permit proper ignition timing.

First, drill the base using an R drill to a depth of about 9/16 of an inch and tap for 1/8-inch pipe fitting. (See Fig. 1.) Now, drill through the side of one barrel, using a #52 drill, so that the hole comes just above the butterfly on the venturi side when it is in the closed position. (Caution: Do NOT drill into the idle passage. See Fig. 2.)

Since the wall is so thin that the drill would come out in the next drilling operation, a small amount of metal should be added by brazing. (See Fig. 3.) Be sure that the surface is thoroughly cleaned so that the braze bonds perfectly with the casting. Before the brazing is begun, insert a small carbon plug in the hole shown in Fig. 2 to prevent the brazing metal from filling the hole. Make this plug long enough so a portion of it extends into the barrel for easy removal after brazing. Should this break on attempting to remove it, it can be dug out with a pointed tool. The center of a flashlight battery makes a good carbon plug. The braze should cover over the plug and thus seal the hole to the outside.

Next, drill the base at such an angle that the drill will pass through the hole made by the R drill and join the hole shown in Fig. 2 which enters the barrel. This hole should be made with a drill of approximately 1/16-inch diameter. (See Fig. 4.) If the drill is started at the right point, this hole will be sealed off by the gasket when the carburetor is installed. Otherwise it may be plugged by tapping and inserting a short screw, which is then cut off flush with the surface of the casting and staked to prevent its working loose. You now have a passage from the hole threaded for the vacuum suction line fitting to the carburetor barrel above the butterfly.

When a carburetor is used on a different engine than that for which it was designed, it may become necessary to alter its metering characteristics. Dual or multiple carburetor installations may also change the fuel/air

(*Continued on next page*)

A spot of braze is torched over hole through barrel. Carbon plug keeps braze out of hole.

Tapped hole and hole in barrel are joined by 1/16-inch hole from base as shown here.

DOUBLE-BARRELED DYNAMITE

continued

ratio, particularly upon acceleration. It is possible to adjust the fuel/air ratio on the double barreled Strombergs over the entire range to meet the requirements of the particular installation setup.

The first step in adjusting the Stromberg double barrel is to make sure the float level is correct. With the car in a position so that the carburetor is level, warm up the engine, then remove the top of the carburetor and check the distance from top of fuel to parting section, with the engine idling. This can be adjusted by bending the float lever arm or changing the thickness of the gasket between the needle seat and the float chamber. (Note: It may be necessary to reduce fuel pump pressure on some engines to prevent flooding.)

The slow idle mixture adjustment may be made by means of the idle adjustment screws. All screws should be open the same amount when final adjustment is made. On dual carburetor installations it is best to keep this setting slightly on the rich side.

If there is a hesitation due to leanness (usually indicated by popping through the carburetor) upon accelerating from a slow

To prevent lean idle, the slow-running jets may be opened slightly as explained in text.

idle, it may be necessary to enlarge the secondary idle discharge holes in the carburetor barrels. This can be accomplished by removing the plugs and running a slightly larger drill through the hole. (See Fig. 5.) A word of warning here: Do NOT enlarge these holes until all other adjustments are made and you are sure the mixture in this range is too lean. Do NOT drill too much. Increase the hole .001 or .002 at a time and check performance.

Main metering jets are available in a number of sizes and it is a simple matter to change jets if you have a special wrench for this purpose. It is also possible to enrich the mixture by drilling out the jets. To check the fuel air ratio delivered by the main metering jets, drive the car for several miles at a fairly fast speed, then cut the switch and kick in the clutch simultaneously. After stopping the car, observe the inside of the exhaust pipe. If it is too rich, it will be black; otherwise, it will be grey. Now remove one or more spark plugs and observe the appearance of the center electrode. If the mixture is too rich, the center electrode porcelain will be dark colored and the entire plug will have a smoky appearance that does not rub off on the hand. If it is too lean, porcelain around the center electrode will be white and perhaps blistered, and the points may have a melted appearance if it is excessively lean. The ideal condition is for the porcelain to be a light straw color near the end, going slightly darker down in the plug.

When two carburetors are installed on an engine, it is often found that the combined discharge from the two accelerating pumps is too much even when set on the shortest stroke, causing the motor to load up momentarily on sudden acceleration. Some mechanics remove one accelerating pump rod to correct this condition. However, while this method will produce a decided improvement if an over-rich condition existed on acceleration, it does not produce an uneven mixture to the various cylinders at this time, and since the power jet is normally opened by the accelerating pump plunger when it is fully depressed to give a richer mixture at open throttle, removing the pump rod will make the power jet inoperative on this carburetor and may cause dangerous leanness to some cylinders at open throttle.

One method of correcting this condition is to drill a bypass hole through the carburetor body as shown (See Fig. 6) to intersect the passage above the check valve and enter the float chamber. A #65 drill should be

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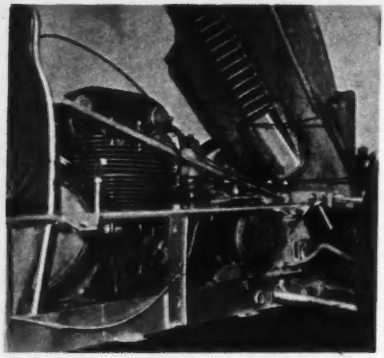
Accelerator pump characteristics may be altered by drilling a bypass from pump (see text).



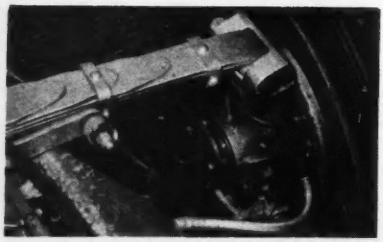
Power plant nestles directly behind cockpit, giving effect of having an engine strapped to your back. Steel seat back is firewall.

COOPER

ONE of the first of the sizzling Formula III cars to go into production was the Cooper. Basically the car is of the now classic type of construction based on Fiat "Mouse" suspension design followed by the first home-built "500s."

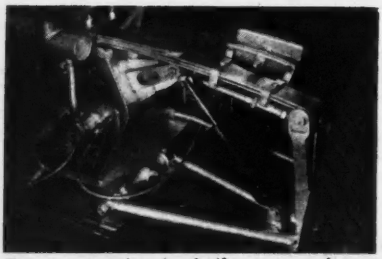
The frame is made up of channel side rails and tube cross members with the rails being reinforced by a light secondary tube member on each side. Suspension is by transverse leaf springs and A-arms with the spring forming the upper arm and the A-arms forming the lower suspension members. In the past, the J.A.P. Speedway motorcycle engine has been practically standard operating procedure in the power department. However, the DOHC Norton Manx is becoming more popular in spite of its considerably higher cost.

THREE OF A KIND

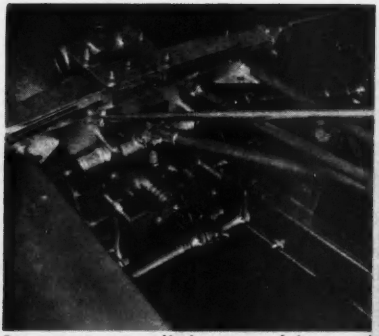


Rear end is fully independent with spring forming top arm. Lower arm is light tube.

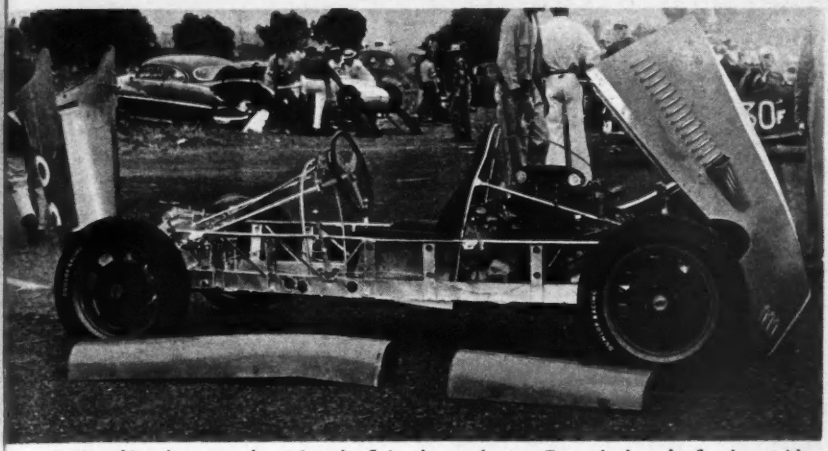
Part of this is due to the Norton's ability to take the full-race treatment without becoming unreliable and part is due to the inherently greater power potential of the DOHC design, the J.A.P. being a pushrod type design. Either engine, or any of the other race-bred 500cc or 30.50 cubic-inch engines, if properly set up, will belt the car over the ground at speeds over 100 mph.



Front suspension is similar to rear layout with diagonal mount tube shock absorber.

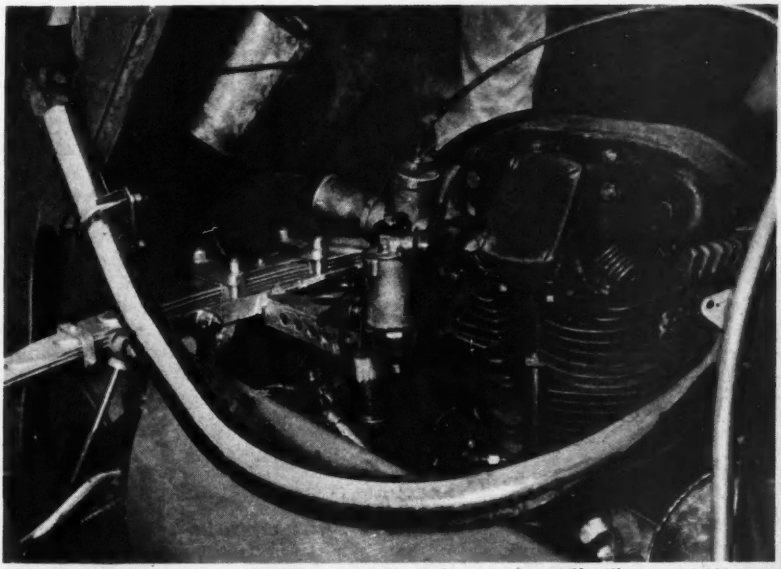


Separate master cylinders control front and rear brakes. Steering is rack and pinion.

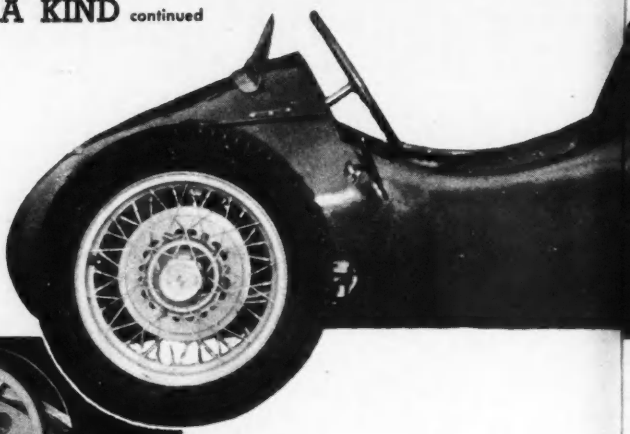


Entire skin of car can be stripped off in three minutes. Extra fuel tanks fit along sides.

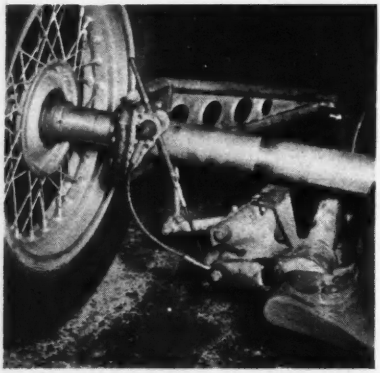
. . . and each one with a full house!



Alfin barreled Norton Manx DOHC engine is becoming popular. Mill will turn up 7000 rpm.



"Office" of the Kieft is similar in layout to any race car. Floor pan is drilled plate.



Rear axle is open-tube swing type with inboard brakes. Note suspension adjustment.

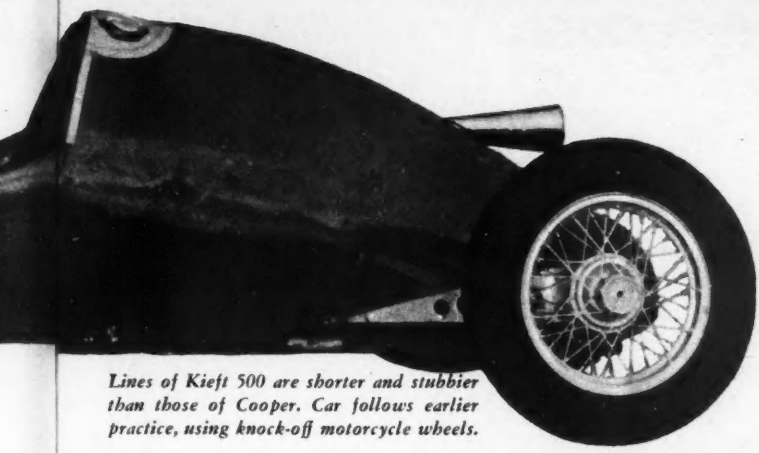
KIEFT

THE only other production 500cc race car available in quantity through an American distributor is the Kieft, a relative late-comer to this side of the pond. Designed and built by Cyril Kieft, who'll make just about any type of racing machine to order, the Kieft 500 has several unique features including pongee cord suspension and inboard rear brakes.

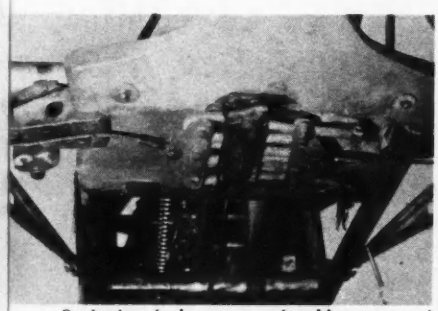
The front rolling gear is independently sprung in the manner of a conventional independently suspended race car with light alloy A-arms coupled with a diagonally mounted tube shock. Brakes on the front wheels are Alfin design and have no backing plates.

The rear end is a true swing axle with universal joints at the inboard ends only. A single huge brake drum on the right hand side of the drive sprocket provides stopping power. The transmission, like that of the Cooper, is a Featherbed Norton box and power is usually either Norton or J.A.P., although the BSA Star Twin 30.50 engine will fit beautifully.

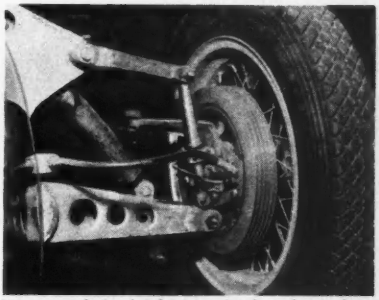
The Kieft chassis design is almost pure aircraft, being made up of a series of small diameter tubes, all triangulated to produce absolute stiffness. The body panels are of aluminum and buttoned on with Dzus fasteners, which, like the Cooper, allows field stripping of the car in less than three minutes.



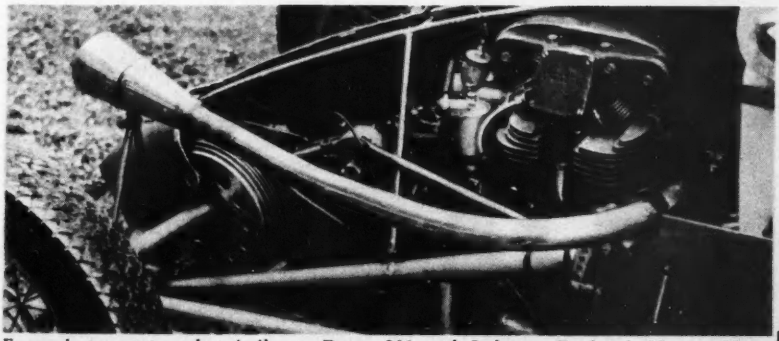
Lines of Kieft 500 are shorter and stubbier than those of Cooper. Car follows earlier practice, using knock-off motorcycle wheels.



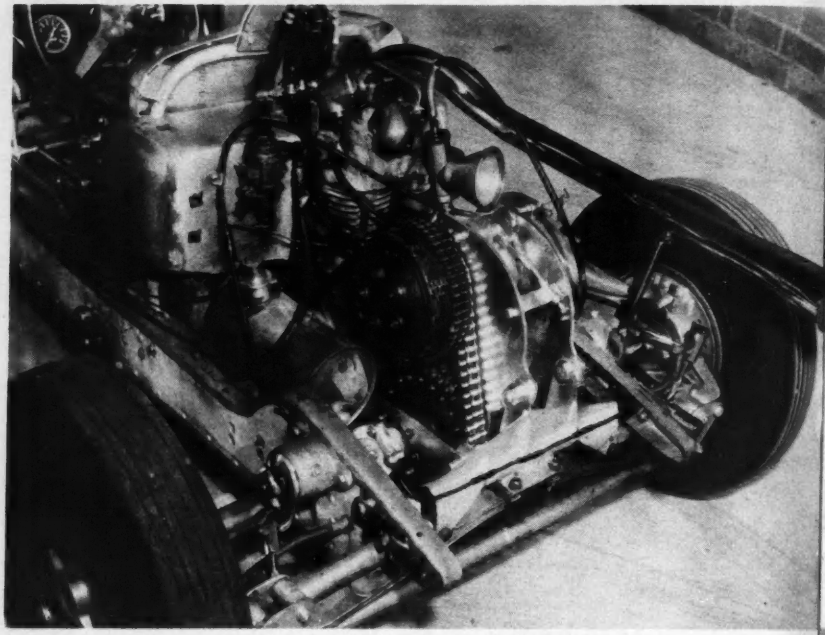
Springing is by means of rubber centered pongee cords connected by cables to axles.



Front end is fairly standard independent unit. Brake is Alfin with no backing plate.



Frame is truss-type tube, similar to Beatty 200 mph Lakester. Engine is Norton Manx.



Power unit in Glass Special is healthy JAP Speedway mill. Winfield bowl feeds Amal carb.

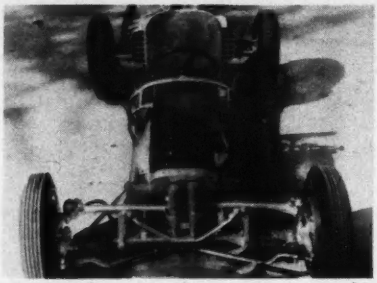
GLASS SPECIAL

FRED Glass used an entirely different approach, coming up with something that looks more like the conventional type of race car. Originally the car was built to run the URA Midget circuits and was equipped with a 460 Johnson outboard mill. Later, when the Offies began to take over the midgets, Glass looked around and decided to go in for the 500 cars.

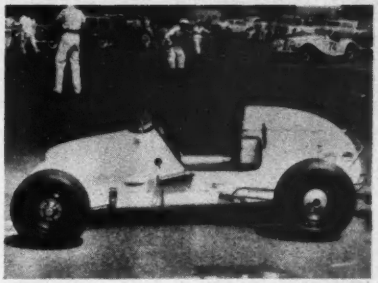
Glass's car follows standard midget practice with a set of boxed channel rails and tube cross members and a midget type tail but there the resemblance ceases. The front end is independent and sprung with inboard coil springs. The upper control arms are made from aircraft connecting rods while the fabricated arms form the lower members. Brakes fore and aft are Bennett Midget units as is the swing axle rear end. The rear axle is sprung in the usual midget transverse method by means of a special five-leaf midget spring from Hollywood Spring and Axle Co. Wheels are center-lock, pin-drive Halibrand magnesium discs with a 12-inch diameter. Skins are 4.00 on the front and 4.50 on the rear.

Power from the Speedway J.A.P. is delivered through a Burman motorcycle gearbox with four forward speeds, to a final drive geared 4.18 to one although other ratios are available if needed. The engine is stock except for a Meyer-Drake high-dome piston giving a compression ratio of 16 to 1, fairly high but usable with methanol fuels.

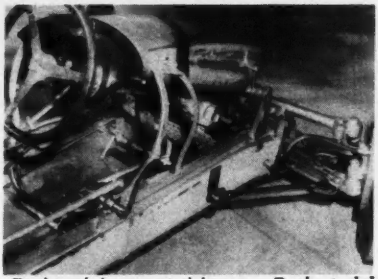
Although decidedly a non-standard item, the car, driven by Bill Black, has had no trouble staying up with the production 500's and more conventional home-built jobs, some of which have been using Nortons for power.



Front end consists of two center mounted independent arms. Inboard coils give springing.

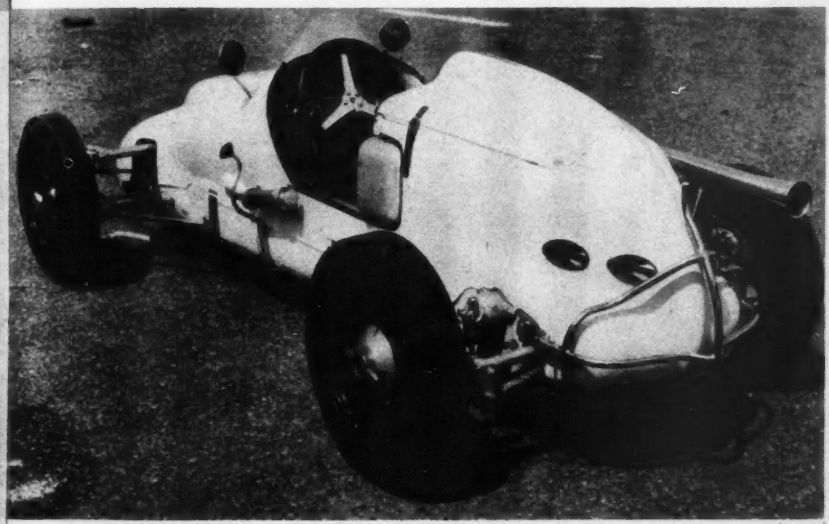


From side, the car looks almost like standard midget from which it was constructed.



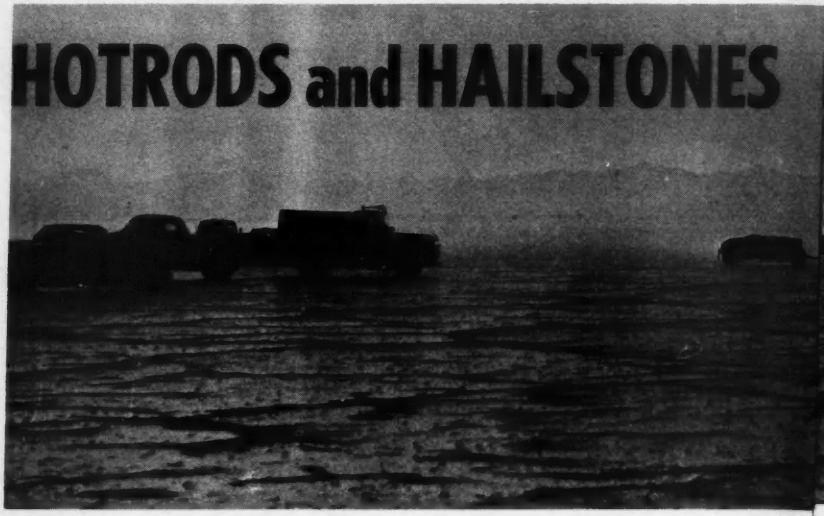
Fuel tank is mounted in nose. Brake pedals are outboard, can be hit with either foot.

Waffle grilled air scoops drag air into engine compartment. Note midget frame rails.

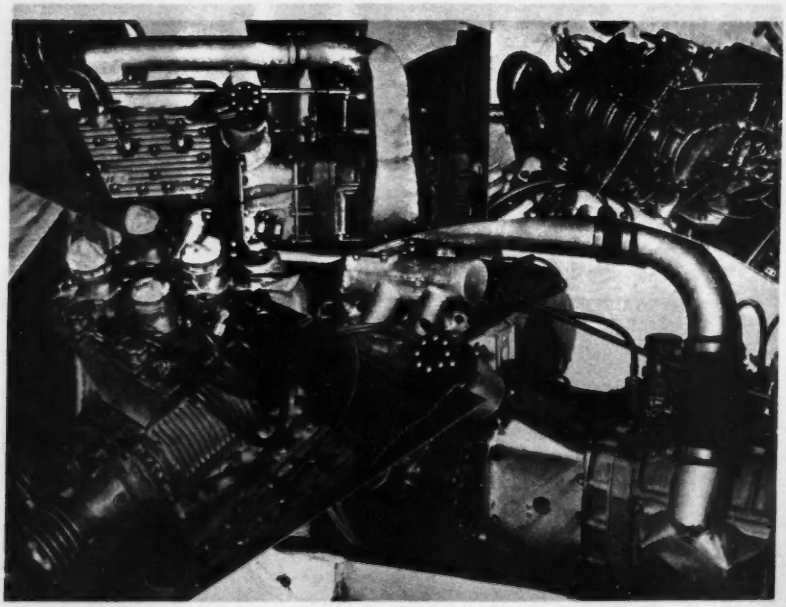


General construction of car follows American midget practice. Air outlets are Buick.

HOTRODS and HAILSTONES

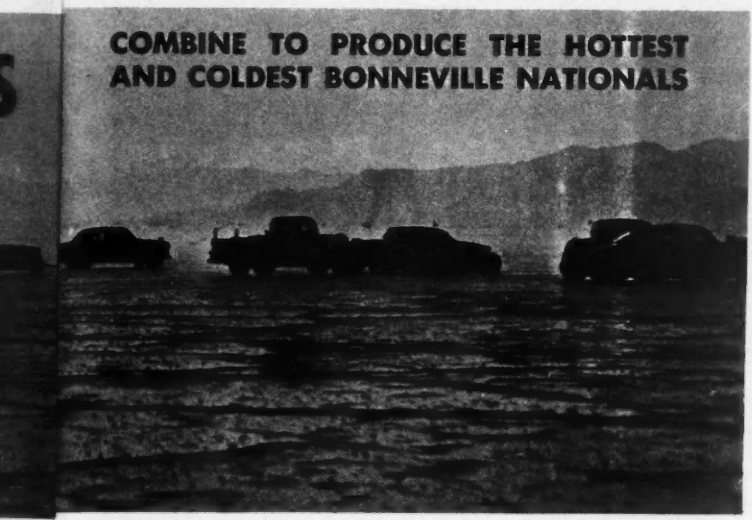


Sizzling hailstorm turns the salt flats into a briny sea, ruining the course and putting



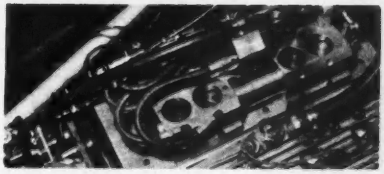
The flat-heads weren't exactly through. Heroic efforts such as the use of these monster blowers pulled speeds right up to the top. However, overhead engines can be blown, too.

COMBINE TO PRODUCE THE HOTTEST AND COLDEST BONNEVILLE NATIONALS



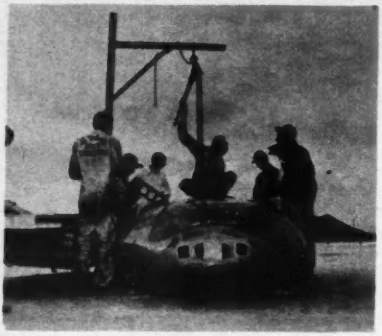
a virtual end to the Sixth Annual Bonneville Nationals. Water receded but wind came up.

This isn't the Holland tunnel under construction but inside of Neumayer-Reed tank.

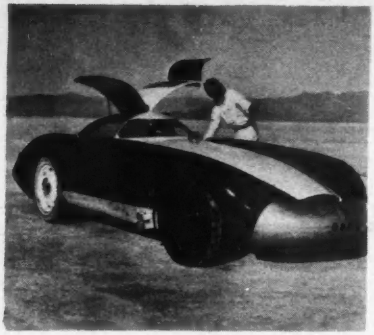


Rotary valve fuel injector was excellent example of home-made equipment at meet.

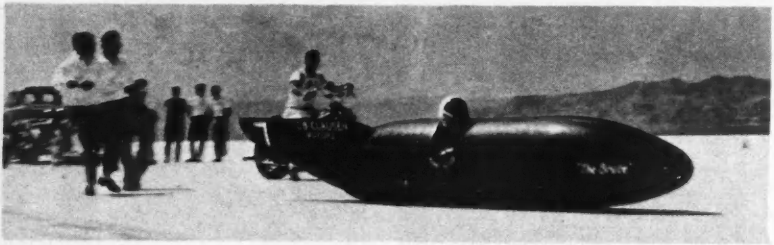
BELOW—Dragsters were out in force, running as lakesters. Ollie Morris is on line.



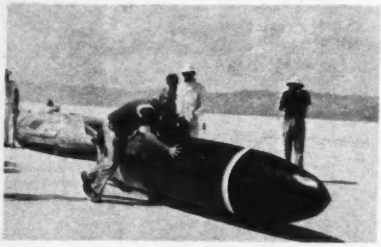
Gene LeBlanc's twin Chrysler streamliner suffered troubles. Best time was 215 mph.



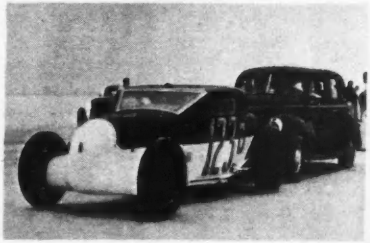
Denny Larsen's new "Super Streetliner" also had trouble but car turned 187 on gasoline.



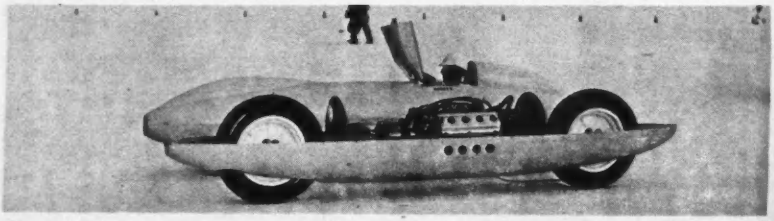
Bob Kelton takes a spill in streamlined "Brute" which couldn't get full speed off line.



This streamlined bike, powered by a 40-inch Triumph, came up from Texas, turned 130.



Don Bishop, who ran Deuce coupe last year, returned to cop D competition coupe record.



Howard Johansen's twin-boom streamliner came up late, didn't get chance to show its stuff.

IF ANYTHING was to be learned from the Sixth Annual Bonneville National Speed trials, it was the ABC's of modern hot rodding: A is for Ardun, B is for Blower, C is for Chrysler, D is for Dodge and DeSoto, E is for Entries (over 300), F is for Fuel (70 percent is adequate), G is for Gasoline (196 mph on gas), and so on down through the whole alphabet.

A look at the record table shows that out of 18 new records set during the meet, 10 were set by cars powered with Chrysler products, either the big hair-bear itself or its smaller cousins the DeSotos and Dodges. Of the remaining eight records, five were set by engines having the same type of combustion chamber and valve layout, these being an Ardun-Merc, a Norton Manx bike engine (in our October cover car), two Porsches and a reworked Jaguar built by motorcycle record holder Joe Simpson. Had a drive shaft not broken in Denny Larsen's new "Super Streetliner" and two front axles snapped in Chet Herbert's new "Beast V" streamliner, it is likely that two more records would have been knocked over by Mr. Chrysler's ball-shaped "horsepower hat."

Another fact is outstanding. From the very first day records started to fall. The usual procedure is for hot rodders to use the first three or four days tuning up with the meet winding up in a final mass assault on existing records. This year, much of the tuning had taken place on the dynamometer with the result that very little tuning had to be done on the lake bed.

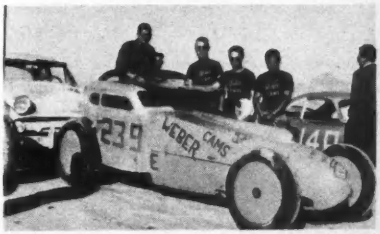
Engine switching was the order of the day. As soon as a car had set up a record in one

(*Continued on page 64*)

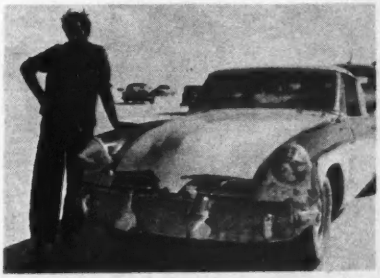
Don Menard loaned his wheels to a fellow San Diegan, although his coupe still ran.

Leroy Neumayer looks out over rim of record-holding, 205.71-mph Ardun-Merc tank.

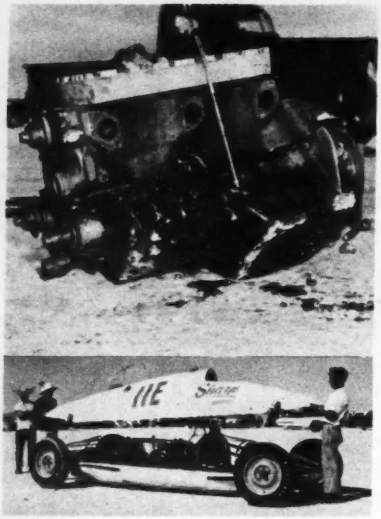
Washingtonian Doug Rice turned 126 in neat chopped and channeled '39 Ford coupe.



Mickey (Mouse) Thompson qualified twin Ford at 195 but blew clutch on record run.



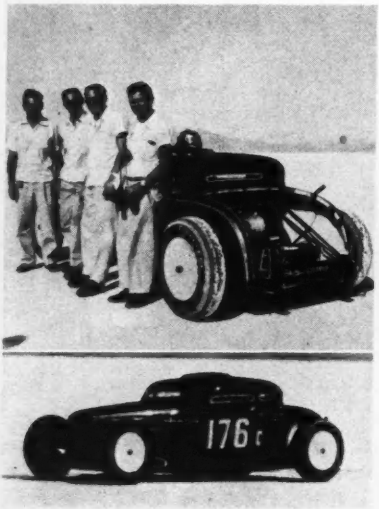
Glen Overmyer captured D coupe record in a Studillac. Note "Sta-lube streamlining."



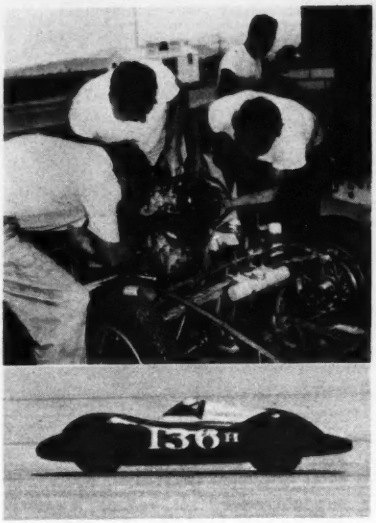
Hales and Moll twin Ford lakester copped E lakester record despite "coughing" engine.

Bruce Crower pushed a lot of wind in blown Chrysler Hudson to take record at 151.91.

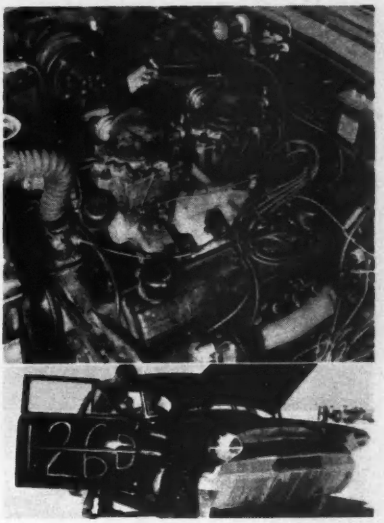
Chrisman-Duncan crew gathered in both B and C comp. coupe records by engine switch.



Bob Bowen isn't bored, merely relaxed before record 248.26 in Shadoff streamliner.

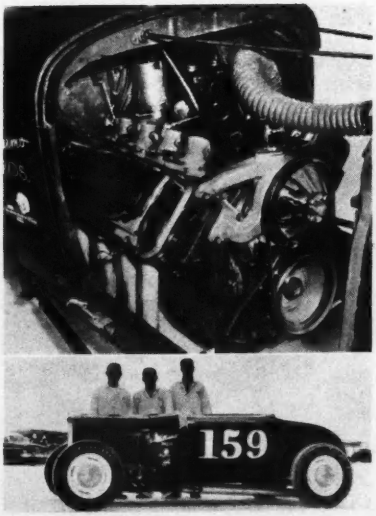


Cooper streamliner (CCM, Oct.) got H record of 110.66; time ran out for the Brute.

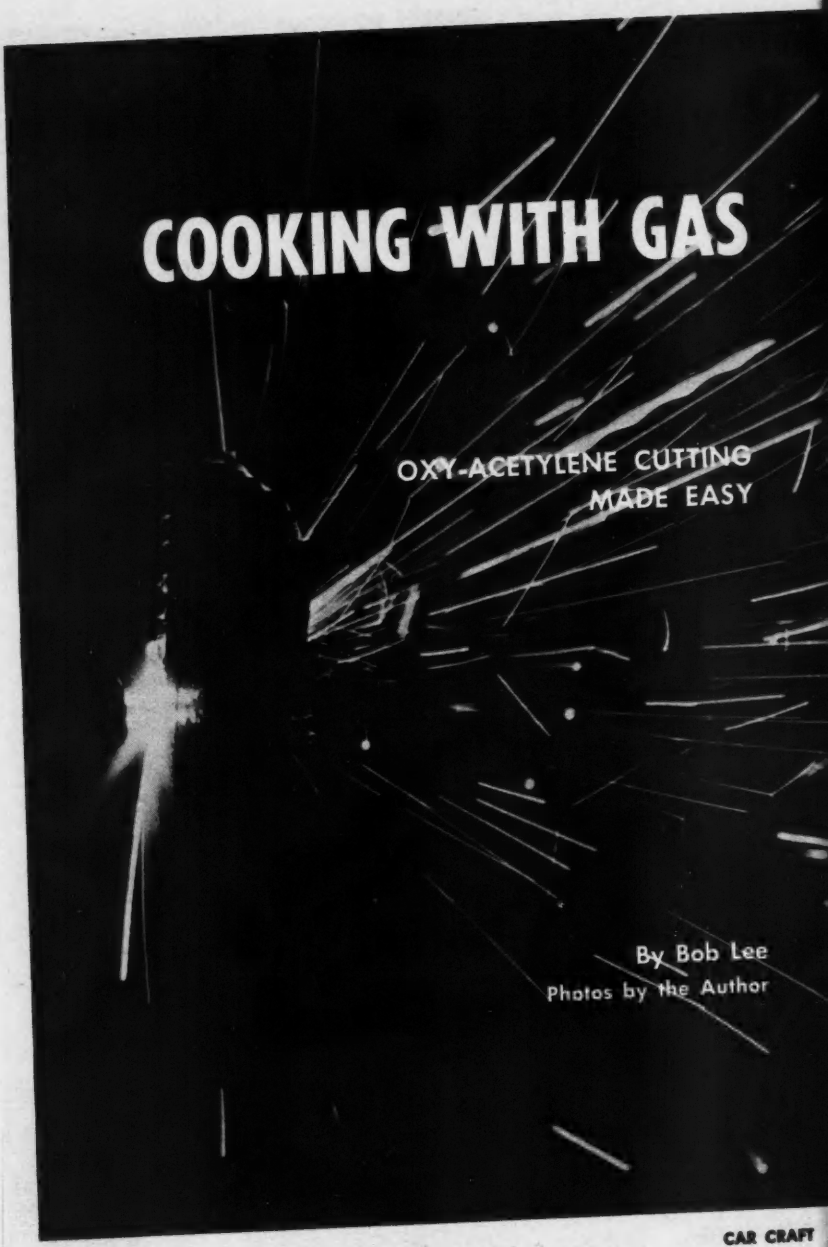


Chicagoan Terry Kaye showed up with a healthy Fordillac, cranked up over 140 mph.

Dodge V8 pushed Williams Brothers' roadster to a record avg. 150.90 mph in B class.



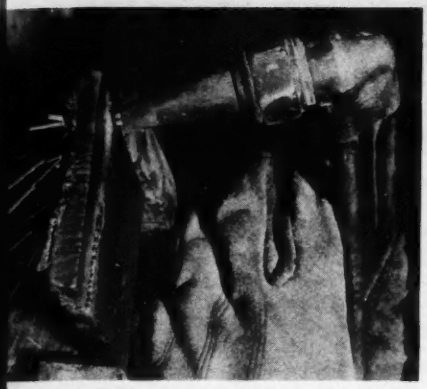
It was Hal Powell's word that finally shut down meet. Cross wind blew him off course.



COOKING WITH GAS

OXY-ACETYLENE CUTTING MADE EASY

By Bob Lee
Photos by the Author



Proper way to hold the torch for cutting is shown here and left. Penetration is good.

This shows the shape of the pure acetylene flame, not yet adjusted for heat control.

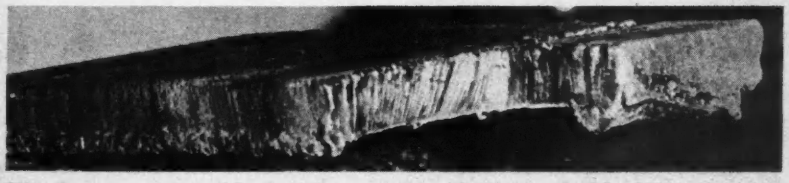
A WELDING torch is a very versatile instrument. Last month its basic abilities were examined and the welding procedures were outlined, but the torch's usefulness goes beyond its ability to weld. With the addition of a cutting attachment, used in place of a welding tip, the torch can cut metals which few shears can touch.

Like the welding operation, the cutting torch uses acetylene and oxygen. The acetylene is used, in combination with oxygen, to preheat the metal. Oxygen is then forced into the molten, preheated metal, and the result is an oxidation which results in a clean cut.

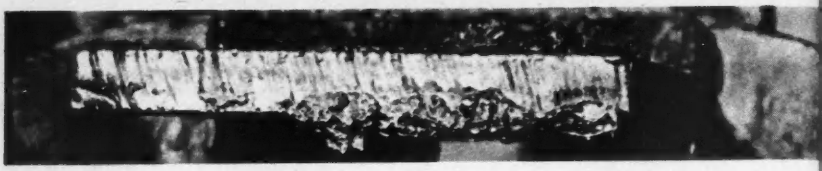
The basic use for oxy-acetylene cutting just that—severing, that is, separating a piece of metal into two pieces. The process can be done in one of two ways: oxygen cutting or oxygen machining. The first, cutting, is a manual process which is generally handled in a free-hand fashion. The second is a precision method used in production cutting.

(*Continued on next page*)

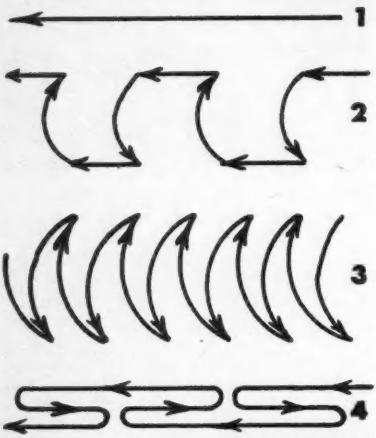
Always wear gloves when cutting. Hands will be in close contact with the hot metal.



This shows a good cut, with relatively straight lines showing good preheat and penetration.



This shows a poor cut caused by insufficient heat. Slag at bottom and gouges are signs.



Four movements for cutting: 1—straight pass for normal use, 2—movement for heavy cast iron, 3—short semicircles for thin cast iron, 4—Variation of No. 1 for thick sheet.

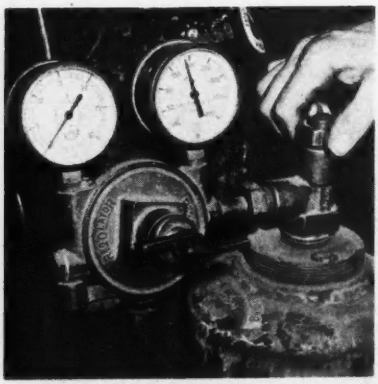
COOKING WITH GAS continued

Obviously, the first method is that used by all hot rodders and automotive rebuilders except in rare instances.

The standard welding kit, as outlined in the first article, will form the backbone of any cutting unit. The only addition necessary is a cutting attachment. The attachment is designed to screw directly on the blowpipe or torch handle and is comparatively cheap in price. The biggest difference between the standard welding torch tip and the cutting torch attachment is the extra oxygen tube on the cutting tip. It is attached to the oxygen hose, at the back of the handle, and to the central jet of the cutting tip at the front. The oxygen is regulated by a hand-lever valve which allows the oxygen to be opened when cutting, through simple hand pressure.

There is nothing else to purchase. As we've explained in the previous article, the connections and parts of the standard welding kit are not changed. The nuts on both the

When setting up cylinders, attach regulators by hand. Use wrench for final tightening.



After regulators are installed, open main oxygen valve. Regulator valve CLOSED.

regulators and the hose connections are designed to prevent switching. The oxygen cylinder regulators have a connecting nut which is about $^{29}/_{32}$ inch in diameter with 14 threads per inch, right hand. The regulator for the acetylene cylinder has a left hand thread with 14 threads per inch on a 0.836-inch diameter.

The hose lines should be left unchanged. They attach to the regulators in the same manner as the threads dictate. The connections from hose to torch handle are also right and left hand thread. The acetylene nut will be a left hand thread and the nut for the oxygen connection will be right-handed.

How it works

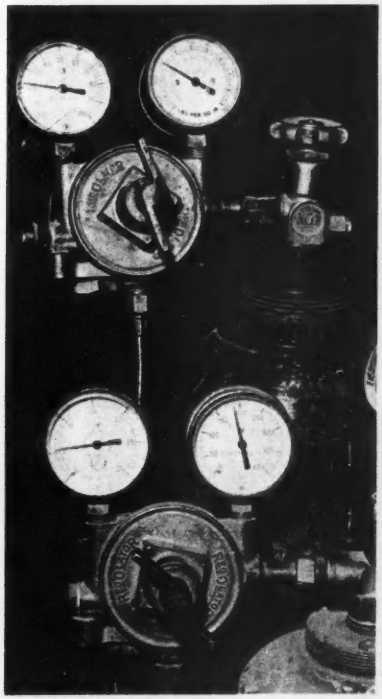
In the process of oxygen-acetylene cutting, advantage is taken of the capacity of pure oxygen to combine rapidly with iron which has been heated to kindling temperature. The cutting tip has a series of holes around a central hole. The holes are similar to the one hole in the welding tip, and burn a combination of oxygen and acetylene. These flames are used to preheat the metal to a molten or kindling stage.

The central jet is connected to the oxygen valve located on the handle. When the metal is heated properly the valve is depressed and a jet of pure oxygen is directed into the kindled metal. The combination of molten iron and oxygen results in a combustion which oxidizes the iron and separates

(*Continued on next page*)

After main oxygen valve is opened, open main acetylene valve, regulator CLOSED.

After everything is secure and main valves are open, adjust regulator for your pressure.



Pressures shown on left hand gauges are the correct ones for basic welding and cutting.

COOKING WITH GAS continued

from the surrounding metal.

In all cutting the preheat gasses are first ignited, with either spark or pilot lighter, and the pressures are adjusted so the flames are stable. The adjustment and ignition are identical to the procedures outlined in last month's article.

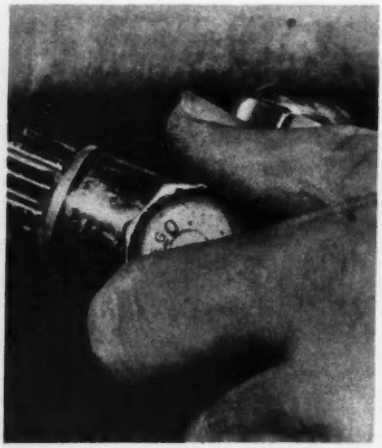
The preheating flames are then directed toward the work, at the edge of the metal where the cut is to begin. Play the preheating flames along a small area at the point where the cut will start. Work the flames around this area until the metal glows bright red. This will indicate the fact that the metal has reached its kindling or ignition stage. Press down on the oxygen valve on the handle. With the preheat flames still directed along the path of the cut, draw the torch along the metal. Advance slowly enough to allow the preheating flames to thoroughly reduce the metal to its kindling stage.

This is easier than it may sound since modern cutting attachments are designed to reduce the guess work. As we've explained, the cutting tip consists of a series of smaller holes surrounding the central oxygen jet. With this design, the cutting torch can be moved in any direction without disturbing the advantages of the preheat flames.

Cutting is not a difficult procedure. There are ten factors which influence the manner in which a piece of metal cuts or is cut. These are: 1) The size of the cutting orifice or jet. 2) The thickness of the metal. 3) The speed of cutting procedure. 4) The pressure of the oxygen. 5) The quality of the metal. 6) The intensity of the preheat flame. 7) The purity of the oxygen. 8) The cleanliness of the tip. 9) The smoothness of the cutting orifice. 10) The angle of the cutting tip to the metal.

The size of the cutting orifice determines, to a degree, the amount of oxygen which comes from it. The oxygen pressure is the other factor which regulates this. When you purchase a cutting attachment, buy one which will handle all of your work. Since hot rodding and general automotive repairs entail but a few sizes of metal, one cutting attachment should suffice. Practice with the cutting attachment until you get the feel of the speed with which you can work. The size of the tip will dictate this speed for you.

The quality of the metal has a lot to do with the quality of the cut. Since the cut's smoothness depends upon the rate and percentage of the oxidation, it stands to reason that a metal which has impurities cannot be completely oxidized and thus cannot be cut cleanly. An impure metal will deposit slag



After all the regulators have been set, you can start on the torch with acetylene knob.

After lighting off the acetylene, crack the oxygen knob, adjusting cones for best heat.

at the bottom of the cut. These can be removed with a dinging hammer.

The same "rough cut" holds true for the oxygen purity. Impure oxygen cannot react completely with the metal and the result will be a less than perfect cut. This can be eliminated with good commercial oxygen.

Cutting

There are four types of movements which are used when cutting metal. These are shown in the accompanying drawing. The first method, a simple straight line pull, is used most often but the other methods are useful with specific types of metal.

When you cut through thin cast iron a straight line approach may burn too much metal. This is circumvented by cutting in small half-circles, similar to the procedure used when welding. This method uses a bit more oxygen, but produces a clean cut on thin metal.

Heavy cast irons require quite a bit of preheating to cut properly. A straight across method would not allow enough time for preheating. The tip is worked back and forth over a small area until sufficient heating is obtained. The constant back and forth movement results in complete penetration of the heat and a clean cut.

A back and forth movement, along a straight line, is a variation of method number one and is used on thick metals just outlined and on hard-to-cut stainless steels.

In all probability, your first cuts will be jagged and full of slag or melted metal beads. Keep practicing, a good cut is not difficult to obtain and can be identified by a smooth, even pattern. The edge will form a series of small hills and valleys. These will be evenly spaced and straight up and down across the face of the cut.

If a cut shows signs of deep, uneven gouges along the face of the cut, it is a sign of insufficient preheating. To avoid this, repeat the cut, holding the torch closer to the metal.

If a slight tendency to "beading," the appearance of a small ridge of metal, appears at the top of a cut, chances are too much preheat has been used and the metal has been heated beyond its kindling stage.

Too much oxygen pressure in the cutting tube can shoot a stream of pure oxygen into the cut in such a way that the oxygen will literally blow the metal out of the cut. It will leave a small hollow or concave curve along the face of the cut.

Trouble shooting

While cutting is a simple operation it is necessary to follow the procedure and to keep the pressures properly adjusted. Failure to

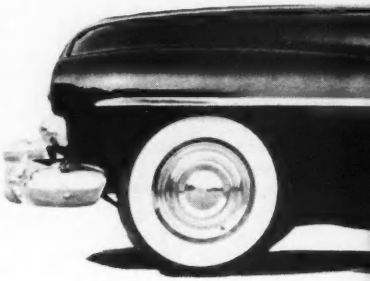
(*Continued on page 65*)

With flame cones properly adjusted for max. heat, open cutting tube oxygen knob.

A final word of advice: Keep it clean! Use only the proper size cleaner, nothing else.

it's BLACK for WHITE

By Bob Lee



BECAUSE Jack White works for Tommy Vaughn, Glendale, California Lincoln-Mercury dealer, it stands to reason he'd pick a Mercury or Lincoln. However, instead of parlaying the gag to its fullest, he upset the apple cart and painted it jet black.

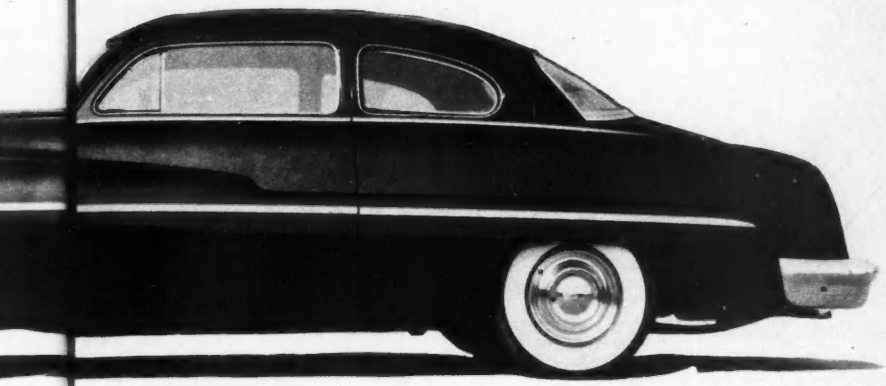
His car is a '51 Mercury—"the best darn Mercury design ever made," he says. It has a minimum of customizing because Jack feels that customizing should be utilized to bring out the car's stock potential—design possibilities which can not be realized in stock production, rather than becoming involved in restyling.

He has carried through on this theme in this little gem. The front was cleaned up. The headlights were frenched and the front grille was restyled to bring out the front nose design more clearly. The stock side chrome was reworked and through the careful use of stock chrome pieces, a new line was achieved. The deck lid was cleaned up and new taillights were designed to complete the rear fender lines. While the front bumper is stock, the rear bumper was changed to Lincoln for a more massive line at that point.

The car has been lowered about 4 inches over-all. One coil was removed from the front springs, achieving a drop of about 3 inches. The rear was lowered with a set of three-inch lowering blocks, which set the car four inches closer to the road.

The work was done over a period of about two years by Neil Emory and Clayton

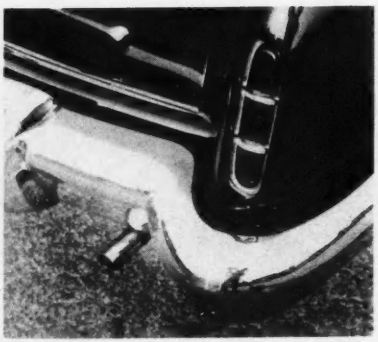
Rear bumper was replaced with stock '51 Lincoln. Tips were reshaped to fender contour.



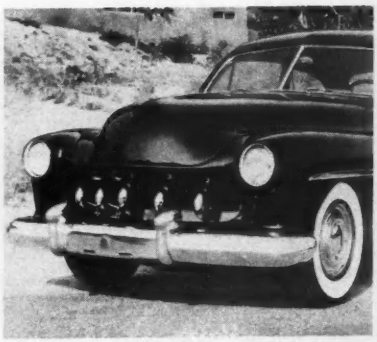
Jensen at Valley Custom in Burbank. The car was created in sections. Each project was considered as a unit. First came the grille and front area. Then the deck and chrome followed. All work was completed as Jack's budget allowed.

The engine is souped to match the speedier-than-stock body design. It now has 8 to 1 compression, the usual porting and relieving plus a 4-throat carburetor which replaces the stock '51 unit. The intake manifold has been smoothed and enlarged and a home-made two coil unit provides a hot spark. The valves are lifted with a Harman and Collins #6129 ¾ race cam. Power is tied to the drive line with a re-worked, heavy-duty clutch.

The car looks fast, with its jet-black enamel paint job, and the engine follows through on the promise.

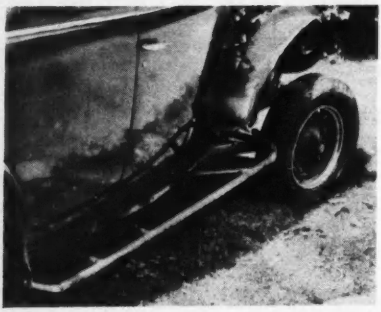


Stock taillights were replaced with '52 Packard units keeping stock vertical motif. Packard units were frenched into the fender approximately ¼ inch enhancing chrome ring.



Headlights have been frenched and the hood peaked and corners rounded. The grille consists of five '52 DeSoto grille bars with all the grille paneling moulded into the body.

HERE'S HOW



Crash rails were installed along the frame rails to replace the stock running boards.

Building a

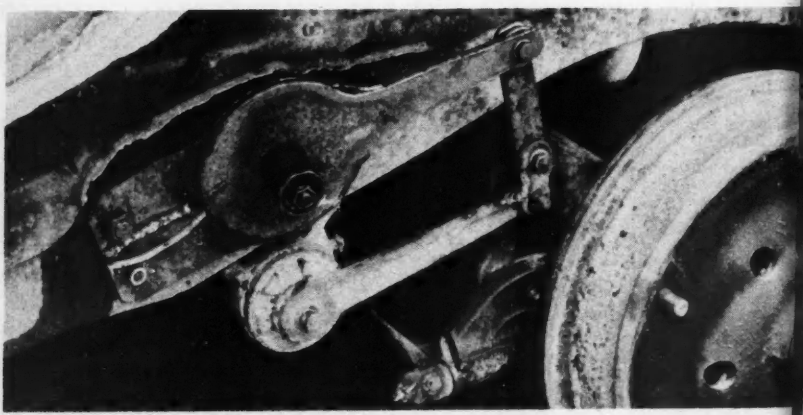
Part I—Rules and Chassis

Text and Photos by Edward Monroe

THE first thing that should be decided before building a stock car for track use is whether it is to be run as a Sportsman or an all out Modified.

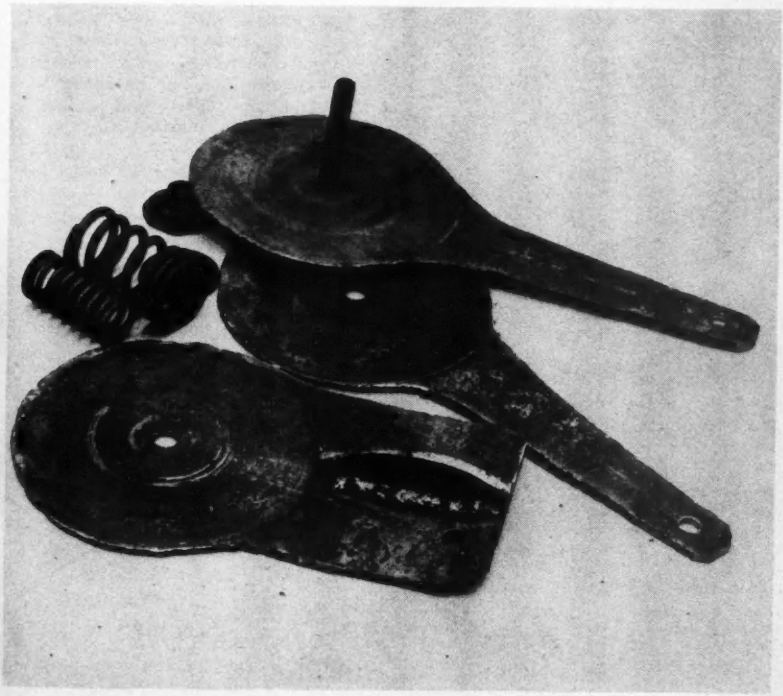
While the specifications for Sportsman and Modified are identical in many respects, they do differ greatly in others. They also differ

(Continued on page 48)



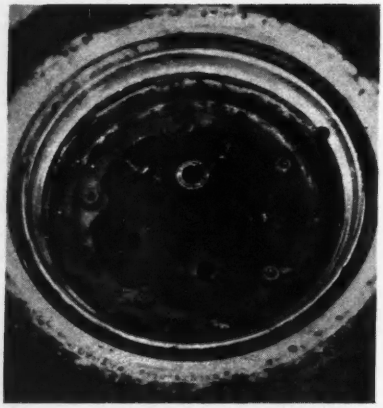
Friction shocks, made from sheet steel, were mounted to frame to augment the stock units.

sportsman class modified stock car

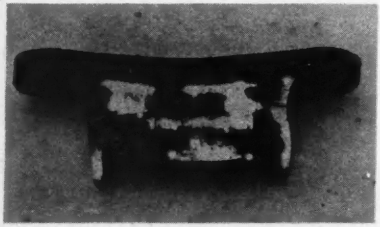


Shock components are held and tensioned by double valve spring as shown, opposite page.

Hubs were marked with equidistant radii, punched around a scribed circle for drilling.



Holes were drilled on marks for lightening and brake cooling. Strength is not affected.



Spring clip bars were built up as shown to make up for removal of 2 rear spring leaves.

HERE'S HOW continued

somewhat with the different clubs and, therefore, it is important to obtain the specifications for the club governing the tracks where the car is to run.

Some of the specifications common to both Sportsman and Modified are:

1. Any U. S. make cars from 1937 to the present year are eligible.
   a. Earlier cars may be used provided they pass inspection as to safety.
2. All cars must have a solid metal top.
3. Engines under 300 cubic inches may be interchanged in the same manufacturer's line, larger engines must remain in the same chassis for which they were designed.
4. Self starter must be on and in working order.
5. Flywheel may be any type or machined in any manner (Note: some clubs require stock flywheel for the Sportsman).
6. Any type camshaft may be used.
7. Any type valve springs may be used.
8. Superchargers are not allowed.
9. Glass sediment bowls must be shielded.
10. Generators may be removed.
11. Fan and fan belt may be removed.
12. Any type radiator may be used.

Body

1. All glass except windshield must be removed.
2. Seats and upholstery must be removed and bucket seat welded or bolted to the frame.
3. No sharp edges allowed on exterior of car.
4. All doors must be welded, bolted, chained or strapped shut.
5. Reinforcement of any part is allowed.
6. All cars must be braced inside with not less than 1¼ inch pipe or 1½ inch angle iron.
7. Fenders may be cut and running boards replaced with suitable pipe or tubing.
8. All fenders that are cut must be rolled.
9. Cars must be equipped with seat belt bolted to frame at two points.

Chassis

1. Rear end must be locked.
2. Rear end gear ratios may be changed.
3. Any type four wheel brakes may be used.
4. Safety hubs may be used in most clubs.

5. Wide base wheels may be used.
6. Bumpers or crash bars must be no wider than the frame and protrude no further than 12 inches from the body.

Rules for Sportsman differ from those for Modified in these respects:

Cylinder heads

Sportsman—Must be head made by the engine manufacturer.

Modified—Any type head permissible.

Carburetion

Sportsman—Limited to one carburetor on stock manifold. Manifold can be polished or enlarged by grinding.

Modified—Any number of carburetors can be used on any type manifold.

Ignition

Sportsman—Any type battery ignition.

Modified—Any type battery or magneto ignition permissible.

From the foregoing, it can be seen that the Sportsman is somewhat cheaper to build.

Now that we've got the rules out of the way, let's build one.—

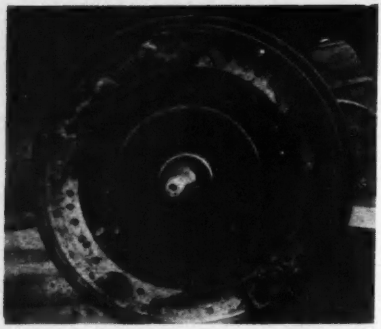
CHASSIS

The Sportsman described in this article was built to the specifications governing a local track near Schuyler Lake, N. Y., as this would permit tune ups, alterations and elimination of bugs without long, expensive hauls. In order to keep the cost of cars at a minimum and in order to be sure of enough cars for a good show, this club has formulated rules which differ from the general rules governing Sportsman in the following respects:

1. Flywheels must be stock and not machined.
2. Heads must not be planed and Denver heads are not allowed.

(*Continued on next page*)

Backing plates were also drilled liberally. Spring perch was lowered as shown next page.



Even the brake shoe webs were liberally punched full of holes. Every little bit helps.

Spring perches were lowered by arc welding heavy-wall tube beneath the original perch.

Plates as shown in sketch were arced to left front spring perch to stop shackle action.

HERE'S HOW continued

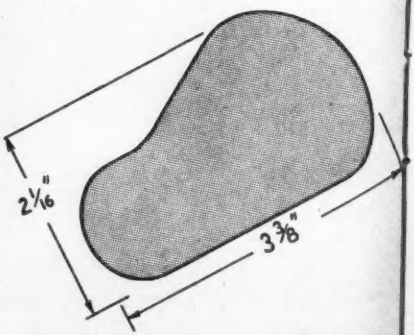
3. Safety hubs are not permitted. (Editor's Note: It is recommended for the protection of spectators and drivers that both safety hubs and safety plates be required.)

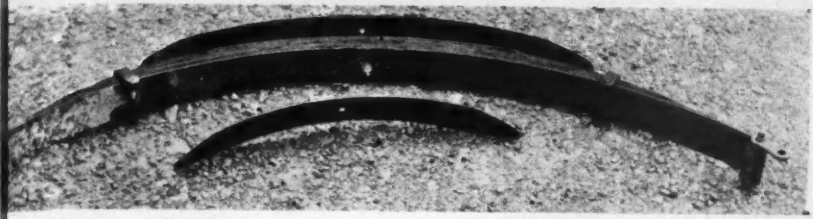
If the car is run in large clubs later on, safety hubs will be installed and the flywheel lightened or replaced with one of aluminum.

The car used was a 1938 Ford coupe. Because Mercury engines are hard to find in this locality and because considerable experimental work was to be done on the engine, it was decided to use the 221 cubic inch Ford engine first. In order that this engine might have a better chance against the larger displacement engines it would be necessary to keep the weight of the car at a minimum and give particular attention to improving the handling qualities of the car.

Since considerable work was to be done on the rear end assembly, this entire unit including the rear spring was removed from the car.

To prevent the left rear wheel from spinning as the weight is lifted off this wheel in the turns and to give better control in slides and drifts, the rear axle was locked. This was accomplished as follows: First, both brake drums were removed. Next, the left axle housing was removed and the differential case, ring gear and axle shafts were withdrawn as a unit. The bolts were removed from the case and the case separated. (See Fig. 1.) The cross, pinion gears and one rear axle shaft were left in one half of the





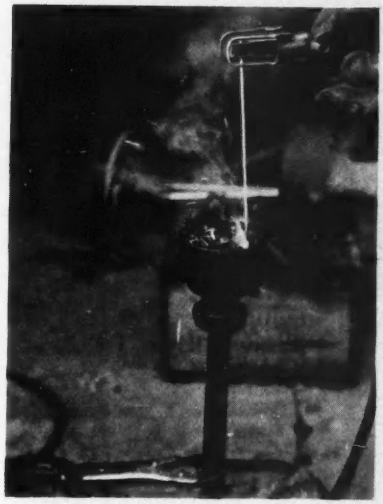
The two smallest leaves were removed from rear spring to slow down speed of action.

differential case. In this way the differential case and axle shaft kept the pinion gears in proper position and alignment during the welding process which followed. Four pieces of 3/16 rod 3/4 inches long were cut and placed in the space between the pinion gears. A nut was laid on the center of the cross to protect this machined surface from weld splatter. The pinion gears were now welded together by bridging over the pieces of rod and fusing to the gears on each side. An arc welder was used for this operation using 1/8 rod and high voltage setting as there is a great deal of arc blow between the gears. (See Fig. 2.) The cross and gears were then turned over in the case and the bead was run on the other side of the gears. All slag and splatter was removed before the unit was assembled. Fig. 3 shows the pinion and cross assembly after welding.

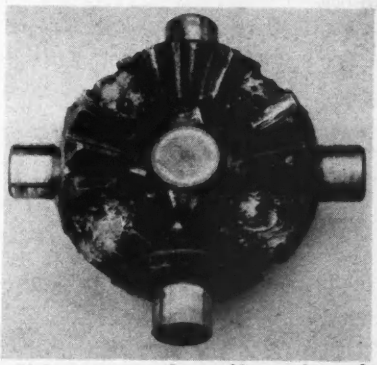
In order to achieve good traction and good handling, the unsprung weight should be kept at a minimum. When a wheel passes over a bump, if the unsprung weight is excessive, the inertia will be so great that the spring will not be able to keep the wheel on the track. As the wheel is thrown upward, it breaks traction. It may also exert enough force to throw the car itself. Reducing the unsprung weight is also one method of reducing the total weight of the car, thereby improving the weight-horsepower ratio and increasing the ability of the car to accelerate. A number of holes were drilled in the backing plate and in the brake shoes in order to reduce the unsprung weight as much as possible. This also helps keep the brakes cool. (See Figs. 4 and 5.)

Drilling the wheel hubs reduced the unsprung weight and also had the same effect as reducing the weight of the flywheel. To locate the hole centers for drilling, a piece

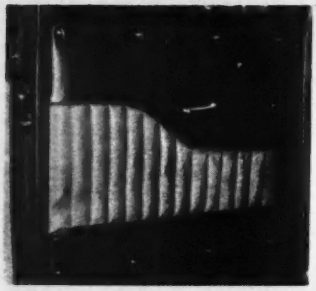
(*Continued on page 61*)



One half of differential case keeps pinion gears aligned during arc welding operation.



Pinion gears are thoroughly arced together to provide a completely locked-up rear end.

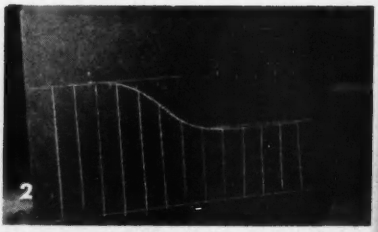


ROLLS AND PLEATS MADE EASY

PART I IN A HOW-TO-DO-IT UPHOLSTERY SERIES

By Bob Greene

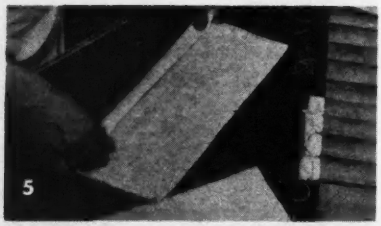
Masonite door panel is marked off for two-tone design with template (top half). Small marks indicate width of pleats.



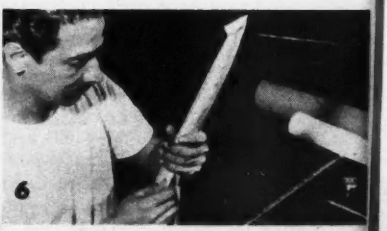
Number and width of pleats is now known. Curve in line conforms with window crank radius. Bottom line denotes scuff pad area.

Coarse backing cloth is then marked off with corresponding number of pleat lines for guide. Two horizontal lines indicate depth.

Naugahyde is brought over line on backing cloth, doubled back, sewn down. Repeated for each pleat, giving invisible stitch.



Coach wadding, cut about 3 inches longer than length of pleat, is rolled into tight bundle preparatory to stuffing the pleat.



Pleat stuffing device consists of long material strip with hooded tip. Wadding is laid along strip, wooden ruler forced into hood.

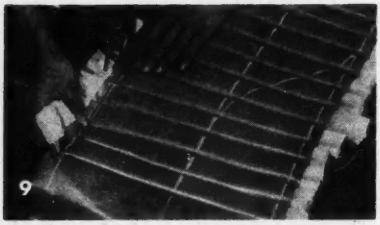
"UPHOLSTERY" . . . is one department that pertains to all car owners whether they're driving a frantic T roadster, prewar pickup or a late model custom. The "plush-bucket" interior is one of the few remaining mysteries to the do-it-yourself customizer. Actually, there's no real secret here. It's just an extension of the old-fashioned quilting operation applied to leather and plastic. There's only one requirement—it has to be done right.

We've received so much mail in which information is requested on this subject that we decided something had to be done about it. Herewith we present the start of a series showing how you, too, can have that full-bore interior. This particular installment deals with door panels, a very basic item. In the next few issues we'll give you the low-down on such other necessaries as seats and headliners. This particular installation was done on the author's '40 Ford pickup by Scott's Top Shop down San Diego way. Although Scotty is an expert, there's no reason why you can't do the same thing by following his lead.

(*Show-how photos continued next page*)

Wadding and stuffing device, pulled tight against ruler, are forced into pleat opening. Stuffer and ruler then pushed through pleat.

Pleats are temporarily placed against panel, and template used to transfer design onto them. Care means uniformity between doors.

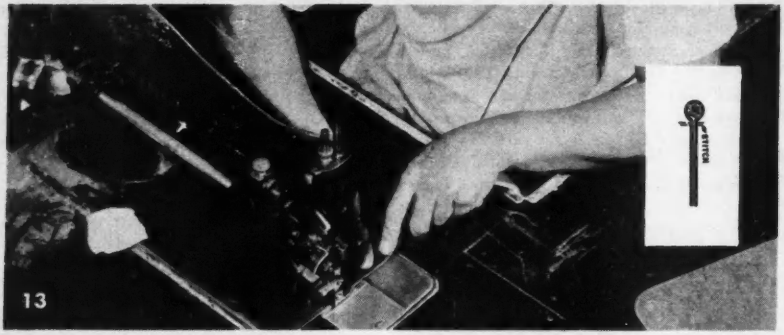


After determining depth of pleats and marking with chalk, outside edges are sewn prior to final trimming of pleated material.

Excessive wadding is trimmed off with shears. This marks finish of panel pleats. Next step will be joining to other half.

By using same curved template, other half of door pattern is cut to match pleats and temporarily positioned before next step.

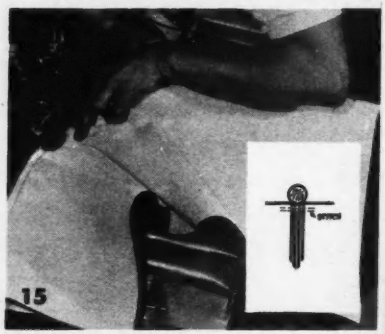
Welting strips are now made. Cut strips of Naugahyde, about 2½ inches in width, long enough for width of curved door design.



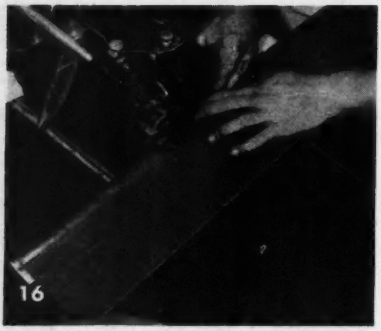
ROLLS AND PLEATS continued

Welt strip is folded over hempcord (back side inside) and sewn tightly against cord. This leaves ¾ inch tail along side of cord.

Welt is sewn against top half of door material. Note cuts have been made at points of curvature so that welt will not wrinkle.

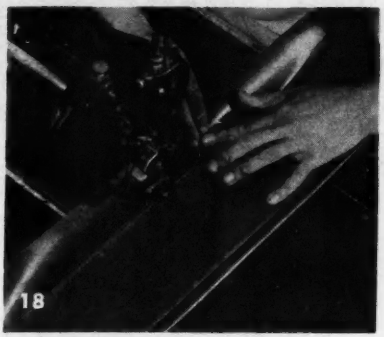


Top half is then flopped and positioned flush along edge of pleated material. Sections, with welt between, then sewn together.



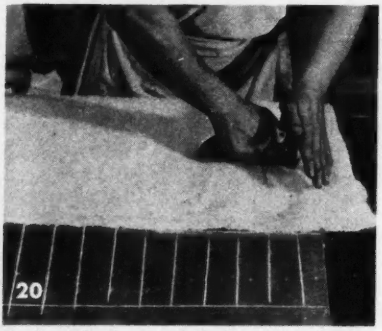
Scuff pad next. Another strip of Naugahyde, with edge rolled under for neat appearance, is sewn along top edge of rug-like material.

Naugahyde is sewn on upside down, on sides and bottom edge of scuff pad, allowing plenty of material with which to tack.



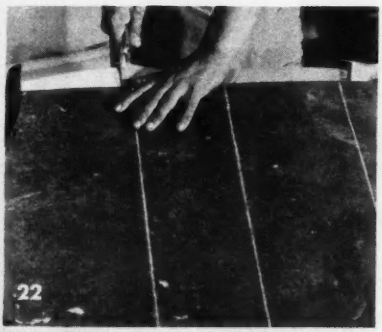
Naugahyde is pulled down and sewn on the right side, giving the scuff pad a double stitch and neat outside appearance.

Near-completed pad is sewn onto bottom edge of pleated section. Note that it is sewn along very outer edge of pad binding.

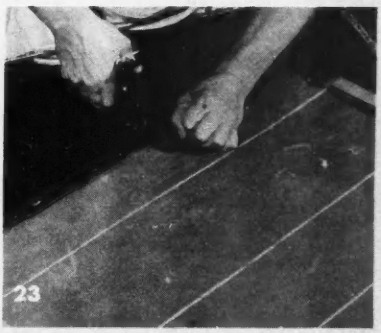


Back with the panel itself, cotton batting is stapled to unpleated half of the panel. Next, trim along curved separation design.

Cover is located on panel, one edge is tacked in place with staple gun. Masonite panel is used here—cardboard is cheaper.



Opposite edge is then pulled tight with a pair of pliers. As a piece is pulled, watch for wrinkles on opposite edge of panel.



All edges are pulled snug and secured. Window crank holes and door latch handles are punched from opposite side.

TORCH TIPS

CADDY HEADLIGHT RIMS

By Dick Day

Photos by Eric Rickman

THE CADILLAC is thought of as "The King of Styling" to most of the custom car enthusiasts across the country. This is evident from the many custom cars that have been designed similar to the Caddy and the many more that have incorporated its components for restyling. The new '54 model has brought on a new twist to the old gimmick of shaded or lipped headlights.

The past customizing approach has been to french the rims or, in other words, mold the stock headlight rims to the fender. This smoothed out the fender beautifully. On the other hand though, it necessitates inserting the light unit from inside the fender making the accessibility of the light poor for adjusting. Installing the new Cad rim allows the light unit to be adjusted from the front.

The rim fits and works out on most of the late model cars and if you're the kind that wants the new look . . . this is it!

(Work done at George Cerny's Body Shop, Compton, Calif., Car is '51 Olds owned by Johnnie Luna)

1

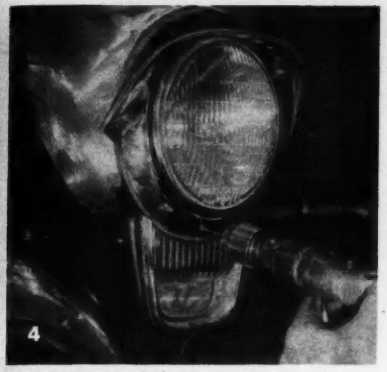
Headlight and chrome trim must be removed. Cut flange from headlight mount.

2

Reverse the headlight's threaded clips and insert headlight from inside the fender.

3

Mounting screws are also run in from inside the fender, then clipped off with snips.



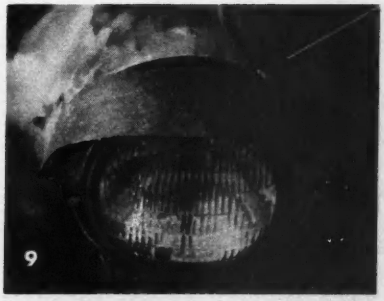
Place Cad rim in position and drill holes for bolting on. Use rim holes for guide.

Grind down working area and cut a piece of cardboard to reach from side to side.

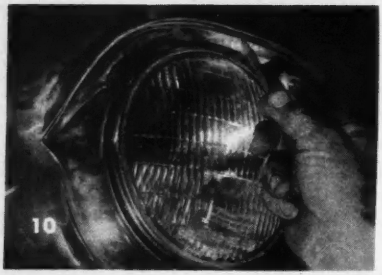
Scribe around the headlight rim to obtain the correct pattern for the metal filler.

Transfer cardboard template to 18 gauge sheet metal and then cut out with snips.

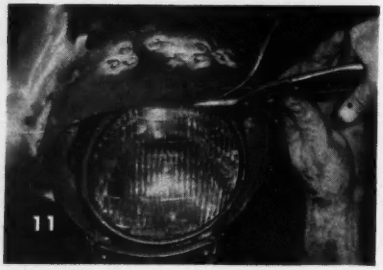
Bend metal to fit. If contour is not perfect, small additional pieces may be added.



After bending metal to contour of rim, tack weld filler piece at 1-inch intervals.



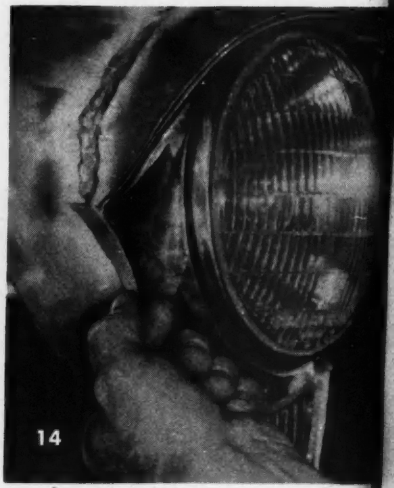
After tacking filler in place scribe exact edge of rim on to the sheet metal filler.



Now carefully trim the edge of the filler to that of the rim with your tin snips.

Tack weld the small filler pieces in place as mentioned above in step number eight.

Where filler doesn't match fender contour, cut small fill-in pieces from scrap metal.



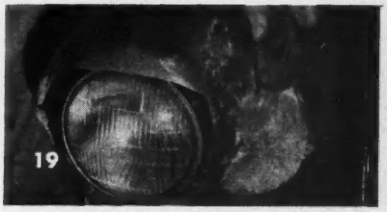
Small sheet metal fillers should be adde at this point to the sides of the rim

After filling in the complete unit, grind area and clean welds with rotary brush.

Place two screws in top of rim before leading, this will create socket for them.

Remove top screws mentioned in step #17, and tin complete area with steel wool pad.

Replace the rim's top two screws and lead entire area. Lead will not stick to screws.

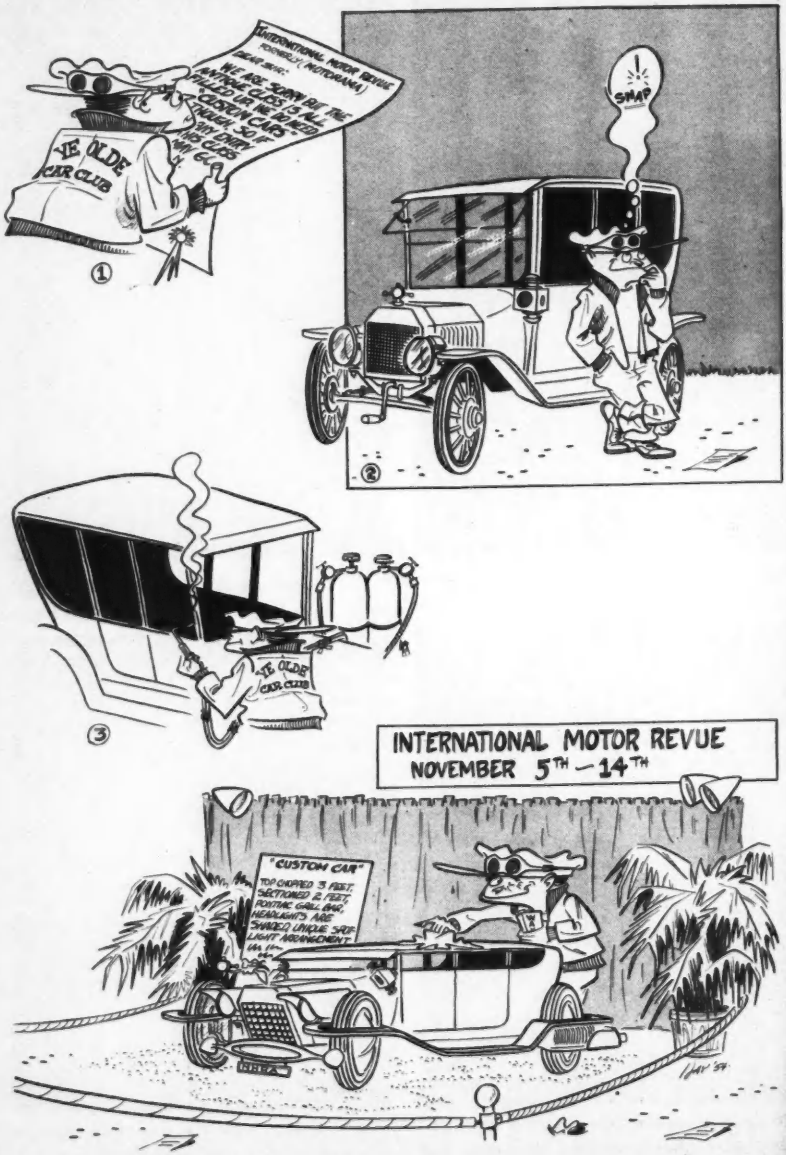


After leading, contour area with various vixen files, sand wet and dry then prime.

"Sheep's Clothing"

HONKER

by Dick Day



HERE'S HOW

(*Continued from page 51*)

of soapstone was held against the hub while it was turned. In this way, a circle was drawn on the hub. Lines were drawn from the clips which hold the wheel caps to the center of the hub. The hub was punched where these lines cross the circle. (See page 6.) Fig. 7 shows hub cap after drilling.

It was thought advisable to lower the body and frame somewhat. To do this pieces of thick walled tubing were arc welded to the spring perches as shown in Fig. 8 and Fig. 9 to form a new, lower position for the spring shackles. The left side was lowered 1½ inch, and the right side lowered 1 inch. Caution: This method of lowering should not be attempted by anyone who cannot make welds which are absolutely sound. Drastic lowering of a car is not advisable as a car which is too low will slide easily. Higher cars put more weight on the outside rear wheel causing it to dig in and thus resist sliding. However, the higher cars will roll over more easily.

It is the belief of the author that better wheel adhesion can be had on a rough track by using a fairly light flexible spring rather than a stiff one, provided the shock absorbers are adequate to control the spring action. As an experiment to prove whether or not this theory is true in practice two leaves were removed from the spring. (See Fig. 10.) This necessitated building up the bars which go across the U bolts in order that the spring could be drawn up tight. (See Fig. 11.) The right front perch was lowered by the same method used for the rear spring.

Shackle action was eliminated on the left front in an effort to improve handling. This was accomplished by welding pieces of 5/16 inch steel plate (cut to the shape shown in the sketch) to the spring perch. The position of these pieces was first determined by spreading the spring to approximately the position it would assume with a normal amount of weight on it and shackling it to the new lower right spring perch. It was now brought over and a ⅜ inch bolt used to hold it between the two pieces after making a bushing for the spring eye. The pieces were now clamped to the spring perch in such a way as to lower the spring approximately 1½ inches and welded, using a number of beads. As a reinforcement and to hold these pieces apart, pieces of 5/32 inch steel were bent so as to wrap part way around the pieces shown in the sketch and welded on each side and also to the perch. (See Fig. 12.)

Stock Ford shock absorbers found to be in good condition were used. The connecting linkages were shortened to compensate for the lowered body position. These were assisted by home-made adjustable friction type shocks. These shocks were made by cutting three pieces from 5/32 inch steel plate. A bolt passed through the center of the circles and through an inner and outer coil spring. Compressing the spring by tightening the nut increases the resistance of the shock absorbers. (See Figs. 13 and 14.) These shocks could probably be improved by riveting facings from the small Rockford clutch such as used on the four cylinder Wisconsin air cooled motors to the center section of the shock absorber. However, these facings could not be obtained quickly without purchasing the entire plate so it was decided to use steel on steel temporarily at least. The friction surfaces were liberally coated with molybdenum disulfide lubricant before assembly.

Approximately 27 lbs. was eliminated by removing the running boards and replacing them with crash rails made of tubing and welded to the frame. (See Fig. 15.) Plymouth drive shaft tubing was used for the bumpers as it was light and strong. (See Fig. 16.) It was originally intended to install hydraulic brakes but inspection showed the brake linings to be new and brake linkage in good condition, so they will not be changed for the time being, at least.

DON'T MISS

PART II

Next Month:

BODY AND COCKPIT MODIFICATIONS

COMPETITION CHEV AND GMC

(*Continued from page 19*)

heavily loaded or burn maximum mixes of nitro. Remember that wide clearances increase lubrication leakage rates which may exceed pump capacity under marginal conditions! In the next issue, we'll cover the oil supply to the lower end for both Chev and GMC versions, as we feel it is of primary importance.

Pistons

Most of the problems which plague the designer of small bore engines are intensified when we use sewer-size holes like the 4 3/16 inch GMC. Not only are the total pressures exerted against the pistons higher, but the expansion of the aluminum alloy piston at this size must be taken into serious consideration. For this reason, some makers have failed to produce a satisfactory performing piston for the big GMC. Luckily, these are in the minority, but here are some points to look for. Permanent molded types insure utmost uniformity of wall thicknesses, aiding weight and expansion control. Look for smooth curvatures inside the pistons with gradually changing section thicknesses. No ultra-thick bosses or slugs should be in the piston head; these create uncooled hot areas and cause pre-ignition. Waffle ridge reinforcement inside the head is not considered the *best* design, uniform curvatures are better. Beefy bosses above the pin are good standard practice. Above all, see that the ring lands are approximately 1/4 inch or wider. Breakage of a ring land may preface piston seizure and a blown engine. Realize that ring loadings are high, particularly with nitro compounds, and deflection in any area produces breakage.

Some GMC blow-ups have been caused by using excessive skirt clearances (about .030 inch) with thin cylinder walls. From our past writings you may have gathered that we don't favor breathing cylinder walls. Here, even more so, because *total* pressures are greater. The only justification for piston clearance is to prevent expansion seizure at high temperatures. High clearances do not, by themselves, reduce friction, as this is a product of the forces of compression, combustion, and centrifugal thrusts. Therefore, expansion control is of paramount importance in any piston. If the piston alloy has the necessary expansion characteristics, skirt clearances in the neighborhood of .008-.012 inch should be sufficient for most competition jobs. More clearance (.030-.040 inch) is naturally allowed in the ring area because of greater heat concentration in the head of the piston. The top compression ring should be placed about 3/8 inch below the piston top to protect it from hot gases.

For both engines, pin fits should be a comfortable push fit at room temperature. Tight pins can wreck an engine! We have inspected rods in which tight pin fits heated the upper rod end to a sizzling blue! Wayne uses aluminum plugs to position his pins in the pistons, a time honored racing practice. Except for the expense, this is probably the nicest arrangement, eliminating the worry that pin retainers might come out.

Piston To Head Relationships

Three different types of pistons are used in the GMC conversions depending upon the selection of head. The flat-top pistons are normally used in the stock version of the "302." As the "270" pistons employ a "pop-up" dome they could not be used with the "302" head, due to interference. Our opinion is that any combustion chamber shape which had opposite sides as parallel flats would tend to be rougher due to poor quench areas. Howard evidently agrees, as his aluminum GMC head will incorporate squish areas similar to the 1952 Cadillac. As combustion chamber shape on the GMC has been a source of wonder to us, the performance of this changed design will be watched with interest. Probably, these factors will be of more use in a sports car engine, due to their greater importance at lower engine speed than when all-out. However, this roughness in the modified engines may be more than incidental in their occasional unguling. As the highest useful compression ratio diminishes in proportion to bore size, we advise very moderate CR unless alcohols only are to be used. Although most equipment options will allow as high as 14:1 C.R., 9:1, and below, seems ample to us. Use of nitro would indicate a further lowering of the squeeze for best operation.

We have purposely avoided any discussion of head characteristics till next month. Suffice to say that better breathing is the

basic reason for the optional equipment heads for both Chev and GMC. As the original Chev head is not the best in this respect, something better was long needed; but wait for next month. You'll see what we mean!

LETTERS

(*Continued from page 7*)

FRAZLER?

Dear Sirs:

I just picked up your September '54 issue today and find it very interesting, especially the article on the Crosley V8 engine. It's really interesting. It just shows what a couple of guys can do with a couple of engines!

I enjoy your "Torch Tips" and "Garage Gimmicks" articles also. They both are real good. Some of your "Garage Gimmicks" ideas are going to come in handy when I come back to the states from Korea.

I am planning on picking up either a late model Ford or a '51 Frazer convertible sedan if I can find one.

Do you think it would be too much trouble to put a Chrysler or Oldsmobile V8 engine in a Frazer? Can I get an adapter to fit a Frazer transmission to either of these engines? If so, where can it be obtained, and how much work would there be involved? Also would there be too much trouble involved if I installed a 2-speed rear?

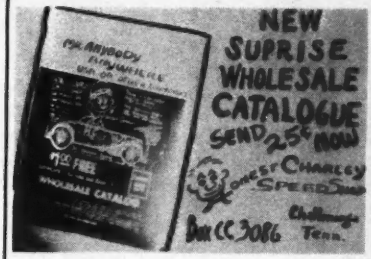
I have always been an automobile and hot rod fan.

I noticed where one of your other readers asked if you've heard of Joe Barzda's supercharged V8-60 racer. Well, I've seen it and can say that it really is a fast little car and really gives those Offies trouble on the track.

Hope to hear from you soon.

Sincerely,
A/2c Tony Dershowsky
Korea

I doubt if the Frazer gearbox is suitable for such conversion. It would be best to adapt a Hydramatic for the Olds or a Powerflite to the Chrysler. If you want a stick shift, it would be best to adapt one which fits the engine in this particular case.—Ed.



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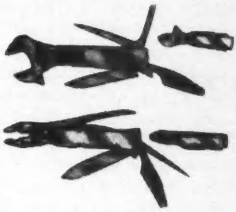

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NEXT ISSUE:
CUSTOM
FENDER SKIRTS
JANUARY CAR CRAFT

HOT RODS AND HAILSTONES

(*Continued from page 35*)

class, out came that engine and in went another in a different class. Harry Duncan and the Chrisman brothers, Art and Lloyd, were notably successful, whacking out records in both B and C competition coupe classes. Art buzzed both the B class Dodge and the C class DeSoto over 7000 rpm in making his 180 —plus record averages.

In the fuel department, mixtures got just a little more sensible with flow characteristics and anti-detonant properties being taken into consideration, rather than a mere "trial and terror" mixing of nitro-paraffins into alcohol or, in truth, mixing small amounts of alcohol into large concentrations of nitro. Benzol, with its excellent fuel characteristics as well as its high anti-detonant and line flow qualities, was used in greater amounts than ever before. This fuel allows the safer use of high percentages of nitrates without many of the disastrous effects of the "alky-and-pop" fuels.

And then again, some folks were restricted to ordinary pump gas. Fastest of these was the Guy Mabee "Streetliner" sports car driven by Micky Wysong. Micky, on his first trip to the salt, didn't know that race cars weren't supposed to run on gas, so there was one psychological handicap removed. He buried his foot in the firewall and turned up a sizzling 196 mph one-way time with a two-way average of 187.66. Denny Larsen, who built the Streetliner, showed up with a new, enclosed "Super Streetliner," also restricted to gasoline. This one turned up a 187 one-way time but broke a drive shaft before a return run could be made.

Then the rains came, and with them, hailstones. From this point on the meet ground slowly to a briny halt. Starting about noon Friday a cloudburst broke over the course area and wound up with a hailstorm around three in the afternoon. By the time the sun came out the course was two inches deep in salt water. The next morning the starting line was moved down a mile but the mushy salt slowed down speed by as much as 20 mph and the remaining brine fouled out the clocks on the long course, causing many of the faster times to be missed, including Leroy Neumayer's fastest run in the Chet Herbert Beast V. On Sunday, the wind and still-slick course forced a complete halt to what may well have been the fastest World Series of hot rodding ever.

There's always next year, though.

NEW RECORDS
1954 Bonneville Nationals

*159	B	Roadster	Williams Bros.	Dodge	150.90
*119	D	Roadster	Voigt & Colb	Chrysler	172.17
* 96	E	Mod. Rdstr.	Harold Raymond Spl.	2 Chryslers	202.07
179	B	Coupe	Toros & Arias	Chevy	138.41
*280	C	Coupe	Quinton Joehnck & Latham	DeSoto	154.34
248	D	Coupe	Glenn Overmyer	Cadillac	141.43
*118	E	Coupe	Bruce Crower	Chrysler	151.91
*176	B	Comp. Coupe	Chrisman Bros. & Duncan	Dodge	180.87
*176	C	Comp. Coupe	Chrisman Bros. & Duncan	DeSoto	180.08
*123	D	Comp. Coupe	Don Bishop	Chrysler	171.57
220	C	Lakester	Neumayer & Reed Bros.	Ardun-Merc	205.71
11	E	Lakester	Hales & Moll	2 Flat-head Mercs	183.63
136	H	Streamliner	John Fox (Cooper Racing Cars)	Norton	110.75
* 27	C	Streamliner	Shadoff Special	Chrysler Marine	248.26
*400	(Big)	Open Sports	Guy Mabee Drilling Co. Spl.	Chrysler	187.66
325	(Big)	Closed Sports	Joe Simpson	Jaguar	127.20
149	(Small)	Closed Sports	David Paramore	Porsche	110.66
337	(Small)	Open Sports	Jack Cardwell	Porsche	95.04

All those entries marked with (*) are powered by Chrysler products, either Chrysler, DeSoto or Dodge.

COOKING WITH GAS

(*Continued from page 43*)

meet these standards will result in either a poor cut or torch failure. The two most common torch failures are backfire and flashback.

When a torch backfires, the gas goes out for a moment, then quickly ignites. It is caused by one of the following:

1. Operating the torch with incorrect pressures
2. Allowing the cutting torch tip to touch the work
3. Overheating the tip or nozzle
4. Working with a head or nozzle which is loose
5. Working with a nozzle or tip which has dirt on the surface

Inspect the torch and tip for these five factors. If any one is found, correct the trouble before proceeding.

A flashback occurs when the flame burns back, inside the cutting attachment. It will usually show as a shrill hissing or squealing sound. If a flashback occurs close the oxygen valve immediately (if you are welding) or the preheat oxygen valve (if you are cutting). This is the one exception to the basic rule in which the acetylene valve is closed first.

Then, close the acetylene valve. Let the torch cool off for a moment. Then, relight the torch in the usual manner and check for flashback. If it continues, check the torch for the troubles outlined in the backfire section. If a remedy here does not remove the problem the torch must be repaired by a competent repairman.

Heat ranges

The heat range is, perhaps, the biggest control available in both welding and cutting. It is dependent upon the type of flame used, and the flame's density and characteristics are controlled by the percentages of oxygen and acetylene used. The most common type is a flame which uses equal parts of oxygen and acetylene, but there are four types of flames.

1. The acetylene flame. This is the first flame to appear. It consists of the combustion of pure acetylene without the addition of oxygen. It has no value in welding or cutting, and is used strictly to gauge the amount of pressure in the acetylene cylinder.

2. As oxygen is introduced into the acetylene flame, at a point where the acetylene is still the major combustible factor, a greenish tinge is noted along the central cone and a feathery edge appears around the outer envelope of flame. This is a carbonizing flame. It has no use in automotive welding and but limited use in special welding techniques.

3. The neutral flame, as explained, is composed of equal parts of oxygen and acetylene. It is identified by a pure, white, central cone and a long outer envelope. It is used for most types of welding and cutting.

4. As the percentage of oxygen is increased, and it becomes greater than the acetylene, the flame becomes an oxydizing flame. It can be recognized by a shorter outer envelope and an extremely small central cone. This flame has very limited use in special techniques, but it can be extremely harmful to most common meals.

Generally, you will use a neutral flame. The technique for obtaining this flame has been discussed in the first part of this article. Listed below are the three flames and their uses:

#1. Neutral flame:

Welding—Cast iron, malleable iron, wrought iron, carbon steel, low carbon steel. All types of cutting.

#2. Excessive acetylene, or carbonizing flame:

In some cast steel welding, alloy steel welding.

#3. Excessive oxygen or oxidizing flame:

Monel welding, some magnesium welding and limited use in aluminum welding.

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DOUBLE-BARRELED DYNAMITE

(Continued from page 25)

used. This will cause a part of the fuel delivered by the accelerating pump to be bypassed back into the float chamber. The hole in the outside of the carburetor body can be drilled slightly larger and plugged. A suitable plug may be made from a nail of the type used to repair shoes. It should be cut down to approximately ¼-inch long and pointed slightly, then tapped gently into the hole. Use caution not to crack the white metal casting. A dab of cold solder or plastic cement will give added assurance against leakage to the outside. The hole in the float chamber can be plugged by the same method, if it is ever desired to use the carburetor again as a single unit.

On dual carburetor setups, it is often difficult to get the carburetor throttles to close tight enough to give a slow idle, even when the stop screws are completely backed off. If the levers hit the stops and the motor idles too fast, it will be necessary to grind or file off the stops. If they do not hit the stops and it is still fast, it means the butterflies are binding in the barrels. By holding the barrels up to the light, the butterflies will be seen to hit in some places and not in others. If loosening the screws and shifting the butterflies will not correct this, then it will be necessary to scrape the butterflies at the points where they hit the barrels. By careful scraping it is possible to get the throttles to close completely and smoothly and eliminate any binding or sticking which might otherwise occur on opening.

If the ultimate in acceleration is desired with duals, it is possible to cut each throttle shaft at the center, so that the butterfly in each barrel is independent of the other. One butterfly in each carburetor can now be hooked up to operate throughout the entire range, while the other two are hooked up to start opening after the middle speed range has been reached and then to open at a rapid rate so that they are wide open at the same time as the first two.

If, in competition service, the flow through the needle valve is insufficient, it may be corrected by drilling the fitting containing the seat slightly oversize and lapping the needle to the new seat, using very fine grinding compound. GO!

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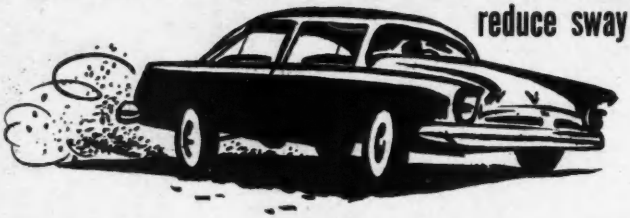

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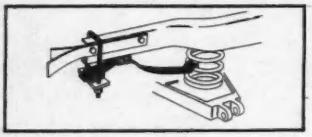

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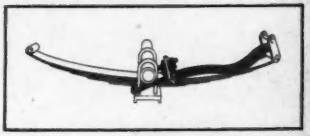

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